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# ENCEPHALITIS

**CARL M. EKLUND, M.D.**

**Senior Epidemiologist**
**Division of Preventable Diseases, Minnesota Department of Health**
**Minneapolis, Minnesota**

THIS summer an unusual number of cases of encephalitis have been reported in Minnesota and North Dakota. Epidemics of encephalitis occurring in the summer months have only been recognized and thoroughly studied during the past decade in the United States. The summer types of encephalitis differ markedly from the form of encephalitis prevalent during the early 1920's. Two types of summer encephalitis have been established on an etiologic basis in this country. The St. Louis type was first recognized in St. Louis in 1933 at which time its etiology was established by the isolation of a filterable virus, and the clinical, pathological and epidemiological aspects of the disease were thoroughly studied. The type of encephalitis due to the virus of equine encephalomyelitis is represented by two forms: (1) The eastern, characterized by a high fatality rate, a predilection for children, and by sequelæ in the survivor; and (2) the western, which, while affecting all age groups and both sexes, tends to affect older people and males, has a lower mortality and sequelæ appear to be rare.

The virus of the western type of equine encephalomyelitis was first isolated from the horse in 1930 and is the etiologic agent of the horse disease prevalent in this area a few years ago. The eastern strain was first isolated from the horse in 1933. The terms "eastern" and "western" refer to the geographical distribution of the disease in horses with the Appalachian Mountains as the line of demarcation. Recently the eastern virus has been isolated from a horse in Texas and in the future the above terminology may lose its significance.

A brief epidemiological and clinical account will be given of the human disease caused by the western form of equine encephalomyelitis virus, since it appears to be the most prevalent type of acute encephalitis in this area at this time. Cases have been recognized in 1937, 1938 and this summer. Cases of the St. Louis type have been recognized through laboratory procedure but clinically they are not distinguishable from the equine type.

The manner of spread in the equine type has not been conclusively established. Contact infection does not appear or appears only exceptionally under laboratory conditions. The disease in both horses and human beings appears at widely separated points simultaneously. Sporadic cases are the rule in human beings and often occur among horses. Cases among relatives and attendants of patients have not been reported, though an occasional associated case can be expected by chance alone with any method of transmission. Sera of contacts and attendants of cases rarely show any protective power. The disease disappears with the onset of cold weather.

These facts are difficult to explain by contact infection and may be more readily accounted for by insect vectors. Mosquito transmission has been most thoroughly studied and ten varieties of aedes mosquitoes have been shown to transmit the eastern or western strains under laboratory conditions. No infected mosquito has been found under natural conditions. Professor W. A. Riley has discussed this subject in the August issue of MINNESOTA MEDICINE.

Insect transmission brings up the question of a reservoir host. The horse does not seem to

be a suitable reservoir since the virus can be isolated only early in the disease and a chronic carrier state has not been established. A wide variety of animals, including birds, are susceptible to infection. Pheasants and pigeons have been found infected under natural conditions with the eastern type of virus. With the exception of the horse no animal has been definitely shown to harbor the western strain of virus; inconclusive evidence of infection of the gopher (Citellus richardsoni) with the western strain has been presented. Despite our imperfect knowledge of spread in this disease, insect transmission explains the known facts better than any other method of spread.

The incubation period of the disease in human beings is not definitely known. Two laboratory infections have been reported. In one, onset was ten days after starting work with the virus and in the other, onset was fourteen days after being sprayed with a virus suspension. The onset of the disease is usually quite sudden, with headache, fever and malaise. Chills or chilly sensations appear quite frequently. In one to two days, occasionally longer, the patient usually feels sick enough to stay in bed and at this time drowsiness and fever are the most pronounced symptoms. In severe cases the fever usually continues to rise and stupor or coma appear. There may be a period of marked restlessness. In cases of any severity, the patient is mentally confused. The only common physical findings are moderate stiffness of the neck and tremor of the lips, tongue and hands. Some report quite frequent absence of the abdominal reflexes. The only laboratory finding of note is an increased spinal fluid cell count. The increase is usually moderate, 30 to 400, with lymphocytes usually predominating. The acute illness lasts ten to fourteen days as a rule. Convalescence may be prolonged because of a feeling of weakness. Recovery is usually complete. Sequelæ appear to be unusual and have been reported chiefly in children in whom severe mental retardation and paralysis may occur.

In diagnosis other acute infections of the central nervous system must be borne in mind. Tuberculous meningitis in older people perhaps simulates this type of encephalitis most closely. Cerebrovascular accident may simulate this disease somewhat. Systemic infections such as typhoid, tularemia, undulant fever and other bacteriemias may have a somewhat similar onset but the subsequent courses of those diseases differ.

Briefly, in this disease there is sudden onset with severe headache and fever followed by marked drowsiness. On examining the patient, moderate stiffness of the neck is noted. Examination of the spinal fluid shows a moderate increase in the cell count. The fatality is not accurately known; figures varying between 7 and 20 per cent have been reported.

An etiologic diagnosis can be made in many cases by the neutralization test. Antibodies appear as early as seven days after the onset. To date, antibodies against the western strain of virus have been found rarely in sera from people with no history of encephalitis, so that a positive neutralization test with a clinical history of encephalitis justifies a diagnosis of encephalitis of the equine type. Isolation of virus from the spinal fluid and blood have each been reported once only.

A positive neutralization test with the St. Louis virus is quite frequently found among normal individuals in an area where the disease is present, and in a doubtful clinical case a diagnosis of the St. Louis type of encephalitis would not be justified unless a blood specimen secured early in the disease showed no neutralization. Not infrequently in the California and Washington cases neutralization of both the equine and St. Louis viruses has been obtained with sera from human cases of encephalitis. In some cases it is thought that previous exposure to the St. Louis virus may explain its neutralization but in other cases it has been suggested that actual mixed infection has occurred. Such an explanation in two comparatively uncommon diseases requires further evidence before acceptance.

To complicate matters further, Cox and associates have reported the horse to be susceptible to infection with the St. Louis virus and presented good evidence that a 1940 outbreak among both horses and human beings was due to this type of virus.

In Minnesota this year an attempt is being made to secure blood specimens from each frank or suspected case of encephalitis both in the acute and the convalescent stages. Neutralization tests are being run with the western strain of equine encephalomyelitis virus and with the St. Louis virus. A great number of blood specimens have

been sent in and of necessity there will be some delay in reporting results on examinations owing to the limitation of the laboratory staff and facilities.

Attempts are being made to isolate the virus from brain specimens. When specimens are sent in, basal ganglia and the brain stem preserved in 50 per cent glycerine, preferably buffered with Locke's solution or with nutrient broth, and iced, should be sent.

There is at present no specific therapy; some go so far as to be very skeptical of the possibility of such therapy being perfected, since it has been shown that antibodies are developed rapidly and can be found in large amounts in fatal cases. There are conflicting reports on the serum therapy of experimental infections. No vaccine has been available for general use. Laboratory workers at biological houses have been vaccinated with relatively crude vaccines given intramuscularly. Its use is said to be painful. There appears to be no reason why a safe vaccine cannot be devised. There has been no great demand for such vaccine in the past because the incidence of the disease has been very low.

The State Department of Health has been requiring quarantine since it is felt that such precautions should be carried out until more is known regarding the mode of spread of infection and methods of exact diagnosis are improved. There is the possibility of the occurrence of the St. Louis type in which there is much more evidence for contact spread than for insect transmission.

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## NEW DEVELOPMENTS IN THE DIAGNOSIS AND TREATMENT OF BRUCELLOSIS (UNDULANT FEVER)*


**WALTER M. SIMPSON, M.S., M.D., F.A.C.P.**

**Director, Kettering Institute for Medical Research, Miami Valley Hospital, Dayton, Ohio; Lecturer in Medicine, Ohio State University**

**Columbus, Ohio**


THE past decade has witnessed a remarkable advance in our knowledge of the incidence of brucellosis. The author's prediction,[107] in 1930, that brucellosis would probably soon become recognized as a public health problem of major proportions, was based upon the discovery of ninety cases of the disease in and about Dayton during a period of eighteen months. Prior to this investigation the disease was not known to be prevalent in this area. The results of other surveys conducted during recent years in widely separated parts of the United States provide unmistakable evidence of the widespread distribution of brucellosis and leave little doubt that this disease is a common and a frequently unrecognized source of disabling illness.

That milk-borne brucellosis may be practically eliminated from a community by the adoption of a universal pasteurization ordinance is demonstrated by the Dayton experience. During the four years prior to the passage of such an ordinance in Dayton, in 1931, 196 cases of brucellosis were encountered. All but one of the fifty-two cases studied by the author during the past decade have occurred in persons who consumed raw milk or unpasteurized dairy products elsewhere, usually while vacationing, prior to the onset of illness. The single exception was an employe of a local dairy who drank milk before it was pasteurized.

Prior to 1926, the sporadic cases which were encountered were regarded as clinical curiosities. Most of these were related to endemic foci of

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goat infection in Texas, New Mexico, and Arizona. From 1927 to 1930, the number of recorded cases rose from 217 to 1,385. During 1929, cases of brucellosis were encountered in every state of the Union. During the eleven years from 1927 to 1938, 794 cases of brucellosis, with sixteen deaths, were officially reported to the Division of Preventable Diseases of the Minnesota Department of Health.[112] In 1940, 3,358 cases were officially reported to the U. S. Public Health Service by State Health Departments.[51] It is undoubtedly true that the number of cases actually occurring in Minnesota as well as in the other States of the Union is much larger than official records would indicate.

Among urban populations, the chief mode of transmission of the disease is by the ingestion of raw milk and unpasteurized dairy products derived from cattle infected with Brucella abortus. Of the 248 patients with brucellosis studied personally by the writer, the ingestion of raw milk or unpasteurized dairy products containing the organism of contagious abortion of cattle was demonstrated to be the source of infection in the great majority of instances. Direct dermal transmission may be the mode of infection among dairymen, veterinarians or slaughter house workers. Hardy expresses the belief that direct contact with infected cattle and hogs has been responsible for a great number of cases of brucellosis occurring in Iowa. Kabler and MacLanahan[65] reported in 1936 that Brucella strains isolated from human cases in Minnesota showed twice as many to be of porcine origin as of bovine origin. This would seem to indicate that the hog is a common source of brucellosis in human beings in Minnesota. It is well to recall, however, that the porcine strain of Brucella has been recovered frequently from cow's milk. Hardy[55] has demonstrated by animal experiments that the skin may act as the portal of entry of the organism. Morales-Otero,[85] of Puerto Rico, has reproduced the disease in human volunteers by inoculations through abraded skin. It is apparent, therefore, that there are two important sources of infection for man: commonly by the ingestion of raw milk or unpastuerized dairy products containing Brucella, or less frequently as the result of direct contact with infected fresh animal tissues or discharges. There is no definite evidence of man-to-man transmission of the disease.

## Clinical Manifestations in Man

Because brucellosis presents many symptoms and signs common to typhoid fever, malaria, tuberculosis and influenza, it is frequently confused with these diseases. Many physicians have arrived at a tardy diagnosis of brucellosis only after repeated negative Widal reactions, the failure to demonstrate the malarial plasmodium, and the inability to elicit physical signs or x-ray evidence of tuberculosis. Less often, the disease has been confused with acute rheumatic fever, subacute bacterial endocarditis, bronchitis, pyelitis, appendicitis, cholecystitis, or tularemia.

## Symptomatology

As knowledge of the clinical manifestations of brucellosis has advanced, particularly during the past decade, it has become more and more apparent that the older text book descriptions of the symptomatology of the disease were based largely upon experiences with brucellosis of goat origin. The classical clinical picture of a disease characterized by an undulatory, remittent, or intermittent fever, drenching sweats, chills, headache, backache, muscular and joint pains, weakness, loss of weight, possibly a palpable spleen, an infrequent skin eruption, leucopenia with lymphocytosis, and secondary anemia, pertains chiefly to the severe acute forms of the disease. In a high proportion of cases, the disease pursues a relatively mild, prolonged course, extending over many months or years. The early descriptions by Hughes[62] and Craig[25] included many such cases. Alice Evans and others have more recently directed particular attention to the common chronic ambulatory form of brucellosis, in which the patient, whose spirits are already depressed by continued ill health, is often given further discouragement when a diagnosis of neurasthenia is made. Many "neurasthenics," whose chief complaints were exhaustion, insomnia, irritability, and a variety of aches and pains have been found to be victims of chronic brucellosis.

Since the symptomatology of the acute and the chronic forms of brucellosis varies so greatly, these two manifestations will be considered separately.

## Acute Brucellosis

The incubation period has been found to vary from five days to longer than one month. In

accidental laboratory infections the incubation period has varied from ten to twenty days. The prodrome is not unlike that of any general infection, with a gradual onset, although in occasional cases the disease is initiated with a sharp chill and rapid elevation of temperature to 103-105 F. (39.4-40.6 C.). A sense of tiredness and weakness, loss of appetite, constipation, headache and backache are common early symptoms. Usually, the patient becomes gradually aware of an afternoon or evening rise in temperature, associated with chills or chilly sensations, nocturnal perspiration and weakness. The patient often feels quite well during the morning hours, particularly in the early stages of the infection. As the temperature rises, during the afternoon or evening, the symptoms gradually return and increase in severity. The nocturnal exacerbations of fever occasionally reach great heights (106-107 F.; 41.1-41.7 C.). There is often a remarkable disparity between the subjective sense of fever and the height of the fever as registered by the clinical thermometer; in many instances the patient does not complain of fever, nor does he present a febrile appearance, but the physician finds, to his surprise, a fever of 101-103 F. (38.3-39.4 C.). As the fever abates, chills and sweating occur. If defervescence is rapid, the perspiration is more likely to be of a drenching character. In such cases, the sweats, which literally saturate the night clothing and bedding, are one of the most impressive features of the disease. The perspiration often has a peculiar sweetish, fetid odor. The chills may be severe enough to be regarded as true rigors in about one-third of the acute cases.[56,107,109] Many patients experience only mild chilly sensations, while in about one-fourth of cases chilliness is absent.

Arthralgia and muscular pains are prominent features of the acute form of the disease in approximately one-half of the cases. The joint pains may be more pronounced during the onset or they may persist throughout the course of illness. The myalgia may be accompanied by a feeling of "stiffness" not unlike the muscular soreness which follows vigorous exercise. Hydrarthrosis and transient periarticular swelling have been observed occasionally. Green and Freyberg[49] investigated the incidence of brucellosis in patients with rheumatic disease. They found that while *temporary* non-purulent joint inflammation does occur, chronic arthritis rarely, if ever, occurs as a complication of brucellosis. We have encountered no instances of permanent joint impairment. Suppurative osteomyelitis as a complication of brucellosis has been described with increasing frequency during the past few years.[5,63,70,71,74,99,101,111,120] In most of the reported cases the vertebræ, particularly in the lumbar region, were attacked. In some instances other bones, such as the humerus, femur, skull, and ribs, were affected. Feldman and Olson[36,37] found similar examples of Brucella spondylitis in twenty-four hogs, an average occurrence of one in every 6,000 swine slaughtered.

Marked restlessness and insomnia usually accompany the nocturnal febrile exacerbations. Delirium occurs in some cases in which the fever reaches great heights. Regional Brucella localizations in the brain, spinal cord or meninges may occur during the acute phase of the disease and produce symptoms and signs of encephalitis, myelitis or meningitis; such complications are, however, more commonly observed as delayed manifestations of brucellosis. The meningeal involvement predominates, and the development of encephalitis or myelitis, or both, is usually secondary to the meningitis. The involvement of the central nervous system may produce the first and only symptoms of the disease. The symptomatology varies greatly, depending upon the extent of meningeal invasion and the presence of additional complications involving the brain, spinal cord or peripheral nerves. In a patient with brucellosis, the development of such symptoms and signs as severe headache, vertigo, diplopia, nuchal rigidity, asphasia, psychic disturbances and various forms of paralysis which are often evanescent, calls for examination of the cerebrospinal fluid. Characteristically, the spinal fluid will be under increased pressure and will show pleocytosis, increase of albumin and a decrease of globulin and sugar. Since the ultimate diagnosis during life depends upon the isolation and identification of Brucella from the spinal fluid, a particularly diligent effort should be made to recover the organism by culture and by guinea pig inoculation. DeJong[27] has recorded eleven verified cases of Brucella meningitis or meningoencephalitis in which the organism was recovered from the spinal fluid by culture or by guinea pig inoculation.

A growing body of evidence indicates that ocular complications of brucellosis are not uncom-

mon. We have encountered at least eight instances of ocular disease occurring as a manifestation of brucellosis. Green[46] has found that the cornea, the uveal tract, the retina, the optic nerve and the external ocular muscles are vulnerable to attack. In addition to four cases (corneal ulcer, retinitis, optic neuritis and central retinochoroiditis) encountered in his own practice, Green describes twenty-seven additional cases reported in the literature. Rutherford[103] found papilledema in three of sixty-three cases of brucellosis examined ophthalmoscopically. Rutherford suggests inclusion of brucellosis in the differential diagnosis in cases of papilledema in which the symptomatology is indefinite. Ruedemann[102] states that brucellosis is responsible for uveitis much more commonly than is generally believed; he found brucellosis to be responsible for chronic uveitis in seven of 125 patients with uveal tract disease.

The matutinal remissions or intermissions and the nocturnal exacerbations of fever may last from one week to many months. The inadequate name "undulant fever" refers to recurring relapses of fever following afebrile intermissions. Such febrile relapses are the exception rather than the rule; most patients experience but one febrile period, lasting from a few days to several months, and finally reaching the normal level by lysis.

The essential gastro-intestinal complaints are anorexia and constipation. The degree of constipation appears often to parallel the severity of the infection. Diarrhea is of rare occurrence. Nausea and vomiting may occur in the more severe cases. Abdominal pain is a not infrequent feature of the disease during its early manifestations. Among 125 cases studied by Hardy, abdominal pain occurred in forty; in ten it was the major complaint. Simpson found abdominal pain to be the chief complaint in sixteen of 142 patients with brucellosis. The occurrence of abdominal pain has often led to appendicectomy in patients with unsuspected brucellosis, the correct diagnosis having been made only after the persistence of febrile symptoms stimulated a further search for the cause. As in typhoid fever, the gall bladder may become a focus of Brucella infection. Brucella has been recovered from the excised gall bladder and from the bile following duodenal drainage in patients with symptoms of cholecystitis.[2,18,79]

Symptoms referable to the respiratory tract may be an outstanding feature of the disease in certain instances. Cough, associated with mucoid or mucopurulent sputum production, is not infrequent during the first few weeks of illness, and may persist for months. Recent reports[8,16,64,72,92] provide convincing evidence that pulmonary lesions of brucellosis are of frequent occurrence and are often detectable by roentgenographic examination, even in the absence of distinctive physical signs of pneumonia. The lesions most often encountered on x-ray examination are peribronchial infiltrations, hilar infiltrations, and scattered discrete or confluent patchy pneumonic areas. The pulmonary manifestations of brucellosis should be regarded as hematogenous lobular pneumonia rather than true bronchopneumonia. Without doubt, pulmonary lesions occur much more commonly than is generally realized. Serial roentgenographic studies will often provide an explanation for vague respiratory symptoms.

The most serious cardiovascular complication has been the occasional occurrence of vegetative endocarditis. Smith and Curtis[110] found reports of nine cases of Brucella endocarditis confirmed by postmortem examination, to which they added a similar case. In most instances the vegetations occurred on mitral or aortic valves previously damaged by rheumatic fever.

The name commonly applied to brucellosis of cattle, "infectious abortion," is derived from the well known predilection of the causative organism for the genital tract. There is strong evidence that the same regional localization sometimes occurs in human beings. Painful swelling of the testes has been described frequently. Acute epididymitis, orchitis, prostatitis and seminal vesiculitis may be early manifestations of the disease. Simpson[109] recovered Brucella abortus from a draining sinus tract which extended from the globus major of the epididymis through the scrotal wall.

There appears to be little doubt that brucellosis is at least an occasional cause of abortion in women who live on farms where they have direct contact with infected animals, or in women who consume raw milk or unpasteurized dairy products. There are reports[26,54,73,105] of human abortion in which the history and serologic findings provide strong circumstantial evidence of the etiologic rôle of Brucella. In a study of 565

cases of brucellosis, Calder[20] found a history of one or more miscarriages in 32 per cent of the married women; a history of one miscarriage followed by sterility was common; a few women reported as many as five or six abortions. More direct evidence has been provided by Carpenter and Boak,[23] who recovered Brucella abortus from the tissues of a human fetus which was aborted at the end of the fourth month of gestation. Kristensen[69] isolated the abortus variety of the organism from the exudate which covered the uterine site of the placenta of a seven-month fetus. Frei[48] isolated Brucella from the vaginal discharge of a woman who had aborted ten days previously.

Loss of weight is an almost constant feature of the acute form of the disease. The greatest loss, often from ten to fifty pounds, occurs in those patients who experience high fever, drenching sweats and great prostation.

A transient cutaneous eruption, usually papular, macular or maculopapular, is a relatively infrequent finding. The skin lesions may simulate the roseola of typhoid fever.

### Chronic Brucellosis

Many physicians feel that the symptoms and signs of acute brucellosis are often sufficiently characteristic to justify such a provisional diagnosis on the basis of clinical findings. In dealing with chronic brucellosis, however, the physician is often faced with a problem which will tax his diagnostic acumen to the utmost. No disease, not excepting syphilis and tuberculosis, is more protean in its manifestations.

Quite naturally, a certain amount of wholesome skepticism has arisen in the minds of some physicians regarding any wide prevalence of chronic brucellosis. Such a feeling of doubt is quite defensible, since one is justified in questioning the validity of some of the diagnostic tests upon which such a diagnosis is often based.

The common and unfortunate employment of the name "undulant fever" has served only to add further difficulties in the recognition of cases of chronic brucellosis. A significant temperature curve, physical signs of disease, and positive agglutination tests and skin tests may be entirely lacking throughout a long period of chronic illness. The recent studies by Evans,[32,33,34] Poston,[95] Angle,[3] Scoville,[104] Thames,[115] Calder,[20] Hamman and Wainwright,[53] Harris,[57] Cameron and Wells,[22] Gould and Huddleson,[47] Gersh and Mugrage,[45] and Angle, Algie, Baumgartner and Lunsford[4] leave little doubt that a protracted, relatively mild, partially disabling, often ambulatory, form of brucellosis is widely prevalent and constitutes a major cause of chronic ill health. Only a small proportion of patients with chronic brucellosis, probably less than 10 per cent, have experienced a previous acute febrile illness, compatible with a diagnosis of acute brucellosis. In many cases the patient is not entirely incapacitated for work, but complains chiefly of weakness and exhaustion, with or without mild fever. Since the commonly employed diagnostic tests are frequently negative in such cases, and since even the most conscientious physician may not find physical abnormalities to account for the patient's complaints, the almost inevitable diagnosis of neurasthenia or psychoneurosis is too often made.

A recitation of all of the symptoms which have been ascribed to chronic brucellosis would serve only to heighten the confusion which as yet surrounds this baffling phase of the disease. In general, it may be stated that the three cardinal features of most cases of chronic brucellosis are weakness, low-grade fever and a lack of objective physical findings. McGinty and Gambrell[78] have listed over 150 different manifestations of chronic brucellosis. Mild degrees of fever may be present for many weeks or months; there may be several months of complete freedom from fever; sudden febrile exacerbations may occur, accompanied by an accentuation of the prevailing symptoms, or by the development of evidence of new regional symptoms affecting the respiratory, cardiovascular, genito-urinary, gastro-intestinal, skeletal or nervous systems. Pneumonia, endocarditis, orchitis, epididymitis, prostatitis, oöphoritis, cholecystitis, hydrarthrosis, arthritis, spondylitis, osteomyelitis, ocular complications or meningo-encephalitis may be associated with the acute form of the disease, but much more commonly appear several months, or even years, after the often indefinite onset of the chronic form of brucellosis. In some instances such delayed evidences of regional Brucella localization may appear long after apparent recovery from the acute manifestations of the disease. All students of chronic brucellosis have emphasized the almost universal prominence of symptoms which relate to the central nervous sys-

tem. In addition to the occasional acute invasion of the meninges, brain and spinal cord by Brucella, there is evidence[94] that the endo-antigen of Brucella organisms circulating in the blood has a toxic action upon the central nervous system. Such observations led Evans[32] to state: "These facts challenge the right of a physician to make a diagnosis of neurasthenia—a diagnosis regarded as dishonorable by the patient, and also by his family, his employer and his friends—without considering, among other possibilities, the possibility of chronic brucellosis."

Chronic brucellosis should be suspected in all cases of so-called "fever of unknown origin," There are many reports of the isolation of Brucella from the blood, urine, bile or from extirpated tissues in patients who have experienced unexplained, long-continued, low-grade fever for years. Hamman and Wainwright[53] re-examined thirty-six such patients; an accurate diagnosis was finally made on ten of them; three were found to have brucellosis.

## Diagnosis

Since it is hazardous to base a diagnosis of brucellosis solely on clinical grounds, recourse must be had to laboratory diagnostic tests. These procedures include *(a)* primary isolation of the causal organism by cultural methods from blood, spinal fluid, secretions, excretions, or excised tissues; *(b)* indirect recovery of Brucella by culture after animal inoculation; *(c)* the agglutination test; *(d)* the intradermal test; and *(e)* the opsonocytophagic reaction.

The only method by which the diagnosis of brucellosis may be completely established is by the *cultivation and identification of the organism.* While cultural techniques have improved greatly during the past few years, with a corresponding increase in the number of reported instances of recovery of the organism, the undertaking is often beset with difficulties and requires skill and, above all, patience. The melitensis and suis varieties of Brucella ordinarily grow readily under aerobic conditions, while the much more commonly encountered abortus variety requires an atmosphere containing 10 per cent carbon dioxide.

The most commonly used and the most reliable indicator of Brucella infection, in the absence of positive cultures, is the *agglutination test.* This is particularly true in cases of acute brucellosis, in which a high serum agglutinin titer will be found in a great majority of cases. Agglutinins may appear as early as the fifth day of illness, but ordinarily are not found until the second week after the onset. In some instances, specific agglutinins may not appear for several weeks. One important source of difficulty in interpreting the results of agglutination tests is the fact that agglutinins may be persistently absent or may be present in low titer in persons from whom Brucella has been cultivated. Another source of error in interpreting the agglutination reaction is the fact that the titer may remain at a high level for months or years after recovery. Then, too, some individuals exposed to the infection may develop agglutinins without notable illness. Furthermore, the level of the agglutinin titer may fluctuate widely on repeated testing. *These considerations call for the exercise of keen judgment in interpreting the results of the agglutination test. A person suffering from some disease other than brucellosis may have a positive agglutination test merely as the result of a previous symptomatic or asymptomatic Brucella infection.*

In the past, diagnostic significance has usually been attributed to titers of 1:80 or above. The choice of such an arbitrary diagnostic titer is not justified in the light of recent studies. In those cases in which the clinical manifestations suggest brucellosis, the absence of agglutinins or their presence in titers of 1:10 to 1:40 should stimulate further bacteriologic and serologic studies.

*While the agglutination test is undoubtedly of great value, its limitations must be recognized. Otherwise, errors will be made in two directions: first, the correct diagnosis of brucellosis may not be made because too much reliance is placed on a negative test; or second, an incorrect diagnosis of brucellosis may be made in a person who has a residual agglutinin titer from a previous invasion by Brucella, but who is suffering from some other disease when the test is made.*

The *intradermal* test is used to determine cutaneous hypersensitiveness to specific Brucella antigen. A positive allergic skin reaction is generally accepted as evidence of past or present invasion of tissues by Brucella. While the great majority of patients from whose blood Brucella has been recovered show a positive skin test, the test has yielded negative results in rare in-

stances in which Brucella infection was proved by culture.

The chief sources of error in interpreting the significance of a positive skin test lie in the fact that the test is frequently positive in exposed individuals with no history of an illness compatible with brucellosis. Furthermore, the hypersensitiveness, once acquired after symptomatic or subclinical infection, usually persists for many years. *Therefore, it must be emphasized that a positive skin test does not mean that the symptoms from which the patient is suffering at the time of a positive skin test are necessarily due to brucellosis.* Students of this disease are only too familiar with instances in which a diagnosis of brucellosis was made only on the basis of a positive skin test and in which further developments revealed the presence of some such disease as active tuberculosis, Hodgkin's disease, leukemia, typhoid fever, malaria, or subacute streptococcic endocarditis. Gould and Huddleson,[47] regard the skin test as the most sensitive diagnostic test for brucellosis; these investigators express the belief that if the skin test is negative, brucellosis may usually be ruled out.

There is evidence[28,46] that the injection of heat-killed Brucella for the intradermal test stimulates the production of agglutinins. Evans[34] found that the intracutaneous injection of brucellergin in twelve volunteers caused the development of opsonins in seven and agglutinins in five; in one instance the agglutinins rose from zero to a titer of 1:320. *Hence, blood specimens for serologic tests should be collected before the intradermal test is performed.*

The inadequacies of the agglutination test and the intradermal test, particularly in distinguishing between present and past Brucella infection, led Huddleson, Johnson and Hamann[61] to reintroduce the *opsonocytophagic reaction,* a modification of the Leishman-Veitch technique for determining the phagocytic activity of the blood in the presence of serum opsonins and homologous leukocytes. The opsonocytophagic test is employed in conjunction with the intradermal test or the agglutination test, or both, to determine the immunity status of an individual giving positive tests by either or both methods. The test is performed by mixing 0.1 c.c. of the patient's citrated blood with 0.1 c.c. of a saline suspension of living Brucella which have been grown for forty-eight hours on liver infusion agar. The suspension should contain at least six billion organisms per c.c. of physiologic saline solution (pH 7.0). The mixture is then incubated at 37 C. (98.6 F.) for thirty minutes, after which a small amount of the sedimented cells is removed with a capillary pipette. A smear is then made from a large drop of the cell suspension, dried rapidly and stained with Hasting's stain or Bordet-Gengou's carbol toluidin blue. The number of bacteria in twenty-five polymorphonuclear neutrophilic leukocytes is determined and classified according to the number of bacteria per polymorphonuclear leukocyte; the absence of phagocytosis indicates a negative result; 1 to 20 phagocytized bacteria indicates slight, 21 to 40 moderate, and 41 or more, marked phagocytosis.

According to Huddleson's interpretation, the opsonocytophagic power of the blood is low during the active infective phase of the disease and becomes marked after recovery. On this basis, it is considered that individuals have developed immunity to Brucella if 60 per cent or more of the polymorphonuclear leukocytes show marked phagocytosis. If as many as 40 per cent of the leukocytes show moderate to marked phagocytosis the patient may be infected and has not yet developed any immunity, or he may be uninfected.

While theoretical considerations lend support to the contentions of Huddleson and his associates as to the value of the opsonocytophagic test, it still lacks confirmation. The studies by Calder,[20] and Keller, Pharris and Gaub,[66,67] appear to provide some support to Huddleson's thesis. On the other hand, Evans[35] regards the opsonocytophagic test as the least reliable of the diagnostic tests in cases of chronic brucellosis; she found strongly positive (immune) reactions in four cases from which Brucella were cultivated, and weak or moderate reactions in recovered cases. Morales-Otero and Gonzales[86] tested over 200 individuals (cattle handlers, milkers and laboratory workers exposed to Brucella infection) with a purified Brucella skin-test antigen, agglutination tests, complement fixation tests and opsonocytophagic tests. They found no correlation between cutaneous allergy to Brucella and the opsonocytophagic reaction. Fifteen cases that were positive to the opsonocytophagic reaction gave a negative cutaneous reaction, while eighteen showing a positive cutaneous reaction were completely negative to the opsonocytophagic

reaction. Lee Foshay[38,39] and the writer, working independently, have found that a significant proportion of patients yield aberrant and unexpected results in relation to their immunity status when the opsonocytophagic test is employed in conjunction with cultural methods, agglutination tests and skin tests. High phagocytic titers (immune reactions) occur in some patients with severe and uninterrupted brucellosis, proved by cultures. Certain recovered patients, asymptomatic for months or years, exhibit marked fluctuations from month to month, running the entire gamut from high to low phagocytosis, or sometimes none at all. *Until more extensive studies have been made on culturally proved cases of brucellosis the results of the opsonocytophagic test should be interpreted with caution and with reservations.*

Hematocytologic studies indicate that leukopenia occurs in the majority of patients with acute brucellosis. In chronic brucellosis, either leukopenia, moderate leukocytosis or normal leukocyte levels may be found. Calder[21] has directed particular attention to the occurrence of active lymphocytogenesis as the most striking and constant feature of the blood picture in all of the manifestations of brucellosis. The lymphocytosis is evidenced by an increase in both percentage values and in absolute number of lymphocytes and by an unusually high proportion of immature lymphocytes (lymphocytic shift-to-the-left). Mild anemia of the macrocytic, hyperchromic type is the rule. The erythrocyte sedimentation rate is usually not high, except when complications such as arthritis are present. Calder expresses the belief that this combination of white blood cell and red blood cell abnormalities is distinctive for brucellosis and provides an additional confirmatory diagnostic aid.

## Prognosis

Fatal outcome is rare, having occurred in about 2 per cent of reported cases. During 1936, 107 deaths from brucellosis were officially recorded in the United States. The importance of the disease is not to be judged by the low mortality rate. The prolonged course and the resulting chronic ill health in a high proportion of cases make the outlook much more serious than the death rate would indicate. Death is usually the result of overwhelming acute infection, terminating fatally during the first few weeks of illness, or it follows a relapse at any stage of the disease due to regional localizations of Brucella in such structures as the meninges, brain, heart valves or lungs.

## Treatment

The most important consideration in the control of brucellosis is *prophylaxis.* The widespread distribution of the infection among cattle renders it difficult to control the infection at its source. Many cows have Bang's disease and eliminate the organisms in large numbers in the milk and vaginal discharges without manifesting symptoms of the disease (abortion, mastitis, sterility and lessened milk yield).

Since 1934, the United States Department of Agriculture has been engaged in a laudable campaign directed toward eradication of brucellosis in cattle. After fifty-five months of diligent effort, ending January 31, 1939, more than a million and a half cattle (approximately 5.5 per cent of the number tested) were found to give positive tests for brucellosis; the infected cattle were condemned and the farmers and dairymen received indemnities to compensate for the loss of the cattle. Unfortunately, no similar campaign has yet been inaugurated to control the disease in hogs and goats.

*There is but one logical method for preventing the transmission of milk-borne infection to human beings, and that is by pasteurization.* Brucellosis is only one of the formidable list of diseases transmitted to man through the use of raw milk and other unpasteurized dairy products. Murray, McNutt and Purwin,[87] Boak and Carpenter,[15] and Zwick and Wedeman[125] have demonstrated that complete pasteurization [143-145 F. (61.6-62.7 C.) for thirty minutes] will destroy Brucella. *The need for strict supervision of the pasteurization process is apparent.* For the protection of the health of those persons whose occupations bring them in direct contact with infected animal tissues we must rely upon education and the institution of precautionary measures.

For those persons who live on farms, or in small communities where pasteurization is not yet practiced, home pasteurization may be carried out by placing the milk in an aluminum vessel and heating it to 155 F. (68.3 C.), stirring constantly, then immediately setting the vessel in cold water and continuing the stirring until cool.

### Prophylactic Immunization

Kolmer, Bondi and Rule[68] have recently reported the apparently successful simultaneous immunization of human beings against both brucellosis and typhoid fever by administering a vaccine composed of 1,000 million heat-killed B. typhosus combined with similar quantities of heat-killed Br. abortus and of Br. melitensis. The vaccine was administered subcutaneously in doses of 0.5, 1 and 1 c.c. at weekly intervals. The vaccination was well borne; the mild reactions were comparable to those following typhoid-paratyphoid vaccine. About 96 per cent of the subjects developed agglutinins for B. typhosus and all developed both agglutinins and immune opsonin for Br. abortus. The serums of about 17 per cent showed some protective antibody for Br. abortus before immunization as compared with 79 per cent after immunization. Similarly, some protective antibody for Br. melitensis was present in 14 per cent of the volunteers before vaccination; after immunization all had protective antibody. Immunization with the vaccine did not appear to produce allergic cutaneous sensitization to brucellergin. These observations would appear to justify more extended trial of this simple method of protection, particularly to those who are exposed to either typhoid or Brucella infection.

### Specific Therapy

While there is considerable evidence that the employment of various types of serum therapy and vaccine therapy has greatly improved the outlook for most patients suffering from acute or chronic brucellosis, it is extremely difficult to evaluate the effectiveness of any form of specific therapy in a disease characterized by natural remissions and by an extremely variable symptomatology. The reported results of vaccine therapy or serum therapy run the entire gamut from pessimism to hyperenthusiasm. More extensive controlled and systematic studies on a large number of patients, carried out over a period of many years, are necessary before definite statements can be made. It would appear, however, that sufficient data have been accumulated to justify the continued and extended use of some of the specific agents.

*A. Serum Therapy.*—Interest in serum therapy, which had waned following the earlier appearance of several unfavorable reports, has been revived by the development of a more potent anti-Brucella serum by Foshay[40,122] and his associates at the University of Cincinnati. Detoxified Brucella antigens are employed for the development of the antiserums in goats and horses. Several favorable experiences with the Foshay serum have been recorded by other workers.[6,24,83,89,123] This type of antiserum therapy should be restricted to patients with acute or subacute brucellosis, preferably to those who have had the disease less than eight months.

*B. Vaccine Therapy.*—It seems probable that the earlier discrepant reports of the effectiveness of vaccine therapy had their basis in a lack of standardized methods for the preparation of the vaccines, both as regards the choice of suitable strains and the concentration of the vaccine. These difficulties appear to have been largely overcome in recent years by the development of better standards for the preparation of therapeutic vaccines.

Brucella melitensis (varieties abortus and suis) vaccine, N.N.R., has been widely employed and is available through the usual trade sources. This vaccine is a saline suspension of heat-killed or formalin-killed Brucella abortus and suis organisms in equal quantities. Vaccines prepared from the melitensis variety of the organism should be utilized only in the treatment of the relatively rare Brucella melitensis infections.

Experience has taught that no rigidly standardized scheme of dosage of vaccine is applicable to patients with brucellosis. Experience and good judgment are essential requisites in determining the proper dosage for each individual. The usual procedure with the commercially available vaccine is first to test for hypersensitiveness by injecting 0.05 c.c. of a 1:10 dilution of the vaccine intracutaneously. If the patient does not experience an excessive local or systemic reaction within the next forty-eight hours, an initial therapeutic dose of 0.25 c.c. is injected into the deep subcutaneous tissues, or preferably into the muscle. Local reactions are minimized by intramuscular injections. If no untoward reaction follows the first injection of 0.25 c.c., a second dose of 0.25 c.c. is given three days later. The dosage is then increased in increments of 0.25 c.c at intervals of three days, until a dosage of 1 c.c. is reached. Ordinarily, two injections of 0.5 c.c.

and two of 0.75 c.c. are given before the 1 c.c. dosage is attained. Five to eight injections of 1 c.c. each may then be given at three-day intervals.

If the patient is highly sensitized, it is wise to begin with intramuscular doses of 0.1 c.c., or, in rare instances of extreme sensitization, with doses of 0.1 c.c. of a 1:10 to 1:100 dilution of the vaccine, and gradually increase the dosage by 0.1 c.c. increments until a dosage of 1 c.c. is reached. If, during the course of vaccine injections an unusually severe local or systemic reaction should occur it is desirable to reduce the next dose to one-half the amount which produced the severe reaction and then cautiously and gradually increase the succeeding doses.

A series of four to six or more sharp systemic, febrile reactions, usually accompanied by a transient exacerbation of symptoms, is the goal of the treatment. Hence, only extreme local or general reactions should be avoided. Elevations of temperature to 103-105 F. (39.4-40.6 C.) are not uncommon within four to eight hours after the injection of vaccine. Such systemic responses may occur following the first injection of a small quantity of vaccine or may not occur until relatively large doses are given. In chronic brucellosis larger doses of the vaccine may be required; if no reaction is provoked after five or six 1 c.c. injections, the dosage may be gradually increased by 0.5 c.c. increments to 2 or 3 c.c.

While some patients who have obtained an apparently satisfactory response to vaccine therapy have had little or no thermal reaction, the most prompt and lasting results have occurred in those who have experienced several such reactions.

Erythema and tenderness at the site of vaccination occur commonly for a day or two following injections. In about 5 per cent of cases, a local hard tumefaction may persist for much longer periods. In a small proportion of such cases sterile abscesses or local areas of necrosis have developed.

*C. Brucellin Therapy.*—Brucellin is a fraction of Brucella cells obtained by growing the organism in liver broth. The bacteria-free active agent is recovered from the liver broth filtrate. This preparation was devised by I. F. Huddleson[58,59,60] and may be procured at the Central Brucella Station, Michigan State College, East Lansing, Michigan.

The dosage of Brucellin must also be adjusted to suit the requirements of individual patients. After the extent of sensitiveness has been determined by the intradermal injection of 0.1 c.c. of Brucellin, the usual procedure in non-hypersensitive patients is to give repeated injections of 1 c.c. at intervals of three days until the morning and evening temperatures between the intervals of injection tend to become subnormal. Here again, one object of this form of therapy is the production of a series of four or more febrile, systemic reactions.

A partially oxidized detoxified vaccine, devised by Foshay and O'Neil[90] has been used with apparent success.[29] Much smaller doses are given subcutaneously at more frequent intervals. The few reports of results indicate the recovery rate equals that of other vaccines or Brucellin. Local or constitutional reactions do not occur with the oxidized vaccine. It has been recommended chiefly for the treatment of chronic brucellosis.

While it is difficult to evaluate the results of vaccine or Brucellin therapy, the experiences of many investigators indicate that about 60 per cent of patients with brucellosis obtain apparently complete recovery after a satisfactory course of either agent. An additional 25 per cent appear to obtain some benefit, while the remaining 15 per cent are not improved.

The contra-indications to vaccine or Brucellin therapy are heart disease, renal disease, arteriosclerosis, meningeal or cerebral localizations of Brucella or the acute fulminating (malignant) form of the disease.

### Non-Specific Therapy

*Non-Specific Protein Therapy.*—Injections of foreign protein substances, such as sterile skimmed milk, typhoid vaccine or typhoid-paratyphoid vaccine have been utilized[17,80,84] for the production of nonspecific shock reactions in the treatment of brucellosis. Erwin and Hunt[29,30] reported good results in twenty patients with acute and subacute brucellosis following the intravenous injection of killed typhoid and paratyphoid organisms. The usual initial dose was 30 to 50 million killed organisms, with two to six additional injections, increasing the dosage by increments of 25 million organisms.

*Chemotherapy.* — Neoarsphenamine, mercuro-

chrome, acriflavine, metaphen, thionin, methylene blue, methyl violet, gentian violet and other chemical substances have been used in the treatment of brucellosis. In most instances the reports of the apparently successful use of these substances were based upon observations limited to small numbers of patients. The very length of the list argues against the specificity of any of them.

*Sulfanilamide and related compounds* have been heralded[1,7,9,10,11,12,13,41,42,44,50,51,52,75,76,81,82,88,91,93,98,100,106,113,114,116,117,118,119,121] as effective agents in the treatment of brucellosis since 1936. After the first wave of enthusiasm, usually based on short observations on relatively few patients, other reports of less favorable or entirely negative results have appeared. Blumgart and Gilligan[14] analyzed the results reported in the thirty-one papers which appeared between 1936 and 1939. Twenty-four of the reports were concerned with only one or two patients. Of the seventy-four cases treated with sulfanilamide or allied compounds, there were sixty-eight apparent recoveries and six failures; fourteen of the sixty-eight patients (20 per cent) exhibited relapse after apparent recovery. The daily dosage of sulfanilamide employed in most cases was 4 to 6 gm. (60 to 90 grains) during the period of fever, with gradually diminishing dosages for three or four days after the fever abated. The administration of the drug was rarely continued for more than twelve days. Bynum[19] reported six cases of brucellosis unsuccessfully treated with large doses of sulfanilamide. Long and Bliss[77] report recurrence of infection in four of five patients whose immediate response to sulfanilamide therapy was apparently quite satisfactory; in two instances Brucella was recovered from the blood after sulfanilamide therapy was discontinued. The writer has had similarly disappointing experiences in several cases treated with large doses of sulfanilamide, sulfapyridine or sulfathiazole, controlled by quantitative blood levels; in several instances apparent remission occurred only to be followed by relapse. *Until more extensive and extended studies are made on culturally proved cases, the value of sulfanilamide therapy in cases of brucellosis must be regarded as undetermined.* In this connection it might be well to recall the fact that a temporary remission is not synonymous with cure.

*Artificial Fever Therapy.*—The observation that recovery from brucellosis often followed the induction of fever by chemical or biological agents led Prickman and Popp[96] to investigate the possible usefulness of artificial fever induced by physical means in the management of brucellosis. Each of three patients was given three artificial fever treatments, each of five hours' duration, at a rectal temperature of 105-106 F. (40.6-41.1 C.); all were benefited by the treatment. Zeiter[124] described a similarly favorable experience. More recently, Prickman, Bennett and Krusen[97] analyzed the results of treatment with physically induced hyperpyrexia in twenty-one cases of brucellosis; apparent cure resulted in 80.9 per cent of the patients. The duration of the disease prior to artificial fever therapy varied from ten days to two and one-half years. We[108] have had similar favorable results in refractory patients who have not responded to vaccine therapy; the usual course employed by us has consisted of six fever sessions, each of three hours' duration, at a rectal temperature level of 105 F. (40.6 C.), given during a period of two weeks; the patients were hospitalized during the course of artificial fever treatments. Artificial fever therapy should be carried out only in properly equipped institutions by thoroughly qualified physicians and nurse-technicians.

## Summary and Conclusions

1. The author's prediction of a decade ago, greeted with some skepticism at that time, that brucellosis would become recognized as a public health problem of major proportions has been fulfilled. Of the 248 cases of brucellosis studied by the author, all but fifty-two occurred prior to the passage of a universal pasteurization ordinance in 1931. In each of the fifty-two cases occurring during the past ten years the patient had consumed raw milk elsewhere prior to the onset of illness.

2. The symptoms of the acute and the chronic forms of brucellosis varies greatly. The diagnostic criteria for acute brucellosis are usually not applicable to the chronic form of the disease. There is little doubt that the chronic ambulatory form of brucellosis is widely prevalent, is often confused with other diseases, and frequently is not recognized. Many "neurasthenics" and patients with so-called "fever of unknown etiology"

have been found to be victims of chronic brucellosis. Less than 10 per cent of patients with chronic brucellosis have experienced a previous acute febrile illness, compatible with a diagnosis of acute brucellosis.

3. The only diagnostic procedure by which the diagnosis of brucellosis may be established with certainty is by the cultivation and identification of the organism. The agglutination test and skin test are of considerable value in the diagnosis of acute brucellosis, but these procedures are notoriously inadequate as diagnostic aids in cases of chronic brucellosis. A positive agglutination test, particularly of low titer, and a positive skin test do not indicate that the person is suffering from brucellosis at the time the tests are made. Both the agglutination test and the skin test will yield entirely negative results in an appreciable number of persons from whose blood Brucella may be recovered.

4. In our hands, the opsonocytophagic test has yielded a high proportion of inconsistent results. We have found this test to be of little value as a diagnostic procedure or as a guide to therapeutic response.

5. Since it is now well established that brucellosis is caused most frequently by the ingestion of raw milk containing Brucella, the most important consideration in the control of the disease is adequate, controlled pasteurization of all milk and other dairy products.

6. Brucella vaccine therapy has produced favorable results in from 60 to 85 per cent of patients with either acute or chronic brucellosis. Sulfanilamide and other sulfonamide drugs are apparently of little benefit. Artificial fever therapy has yielded favorable results, particularly in those refractory patients who have not responded to vaccine therapy.

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# PRESENT-DAY TREATMENT OF COMPOUND FRACTURES*
## With an Analysis of Twenty-five Consecutive Cases

THOMAS M. JOYCE, M.D.

Portland, Oregon

SINCE man first began having accidents, the treatment of compound fractures has, no doubt, challenged the skill of the orthodox as well as the unorthodox surgeon. In accepting the challenge, the surgeon has not only learned means to combat shock and mitigate pain, but he has gone a long way toward mastering the principles underlying reconstruction of broken bones and injured tissues as well as towards coping with fatal infections. While the end-results of present-day treatment still leave much to be desired, fewer people today, surely, in spite of the appalling increase in accidents, suffer crippling deformities and poorly functioning limbs than in former times. Now it is everywhere stressed that compound fractures are emergencies, and that they should be given the same prompt and careful attention accorded to emergency conditions from other causes. And the duration of the interval between the time of trauma and the institution of adequate treatment is regarded as the most important single factor to influence the success or failure of the treatment.

### First Aid

It has been stated that treatment of compound fractures properly begins at the scene of the accident.[19,20] Some surgeons[2,11,45] strongly urge that motor policemen, firemen, ambulance drivers, and all others who first handle the patient be taught adequate measures to prevent additional trauma and shock—such measures as application of a tourniquet, covering the wound with sterile gauze, and traction immobilization in a suitable splint. Stevenson[43] warns that no attempt should be made at the scene of accident to cleanse a compound fracture of the skull. Only a simple sterile or alcohol dressing should be placed on the wound, and a tight bandage applied. He warns further that no patient with a "head injury should be moved until a posterior splint has been applied to the spine as well," and that all constricting clothing about the neck should be loosened.

### Shock

How much to do or not to do for shock *per se* appears to be a controversial problem. Cubbins and his associates,[11] among others, prefer to treat shock first. They "have made it a standing rule to wait six or eight hours if necessary until the patient has recovered from shock before proceeding further." Other surgeons[2,13,45] are of the opinion that débridement and immobilization should be done promptly even in the presence of shock, unless the shock is of such severity that any treatment except for it is definitely contra-indicated. Orr[36] contends that shock, hemorrhage, and swelling "may be prevented or relieved by immediate reduction and control of the injured parts in correct length and position. With reduction of the fracture there is restoration of circulation and nerve supply; hence all of the physiologic functions in the injured part may be expected to improve," he argues. All authors agree, however, that it is of vital importance to institute treatment at the earliest possible moment. As Thomson[45] explains, "the chances of eliminating infection are reduced with each hour of delay. From six to ten hours after the accident, infection has gained a foothold in the tissues and is hard to combat." Heyl[20] and also Hermann[19] call attention to the necessity of a thorough general examination of

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the patient in order to detect any possible serious injuries less evident than the fracture.

### Débridement

Meticulous, yet gentle, débridement is looked upon by most surgeons as an essential procedure in the management of compound fractures. McBride[30] asserts that "débridement does not need to be radical. Only tissues so ragged and macerated as to cause necrosis need be excised." And Heyl, as well as others, feels that débridement should be done within six hours after trauma or not at all.

Individual débridement technics vary more or less. As a rule, however, all foreign material and devitalized tissue are removed. Trauma to healthy tissue is avoided, and careful hemostasis is performed. Sponging by pressure is preferred to wiping. Sutures are avoided as much as possible, and when necessary are of fine catgut, silk, or cotton, and placed without tension. Gloves and instruments are changed frequently. Eloesser[14] points out that "wide incisions into skin and fascia are unimportant and can be repaired perfectly; insufficient ones are very important and will determine future loss of the limb, sepsis, spreading osteomyelitis, gas gangrene and phlegmons of the soft parts."

The use of strong antiseptics is generally condemned. Prolonged irrigation with warm saline solution is the cleansing medium most frequently recommended. In some instances a wash with a mild antiseptic or ether is also added. Cannaday[6] has recently been cleansing wounds with a 3 per cent solution of cocoanut oil soap, followed by irrigation with normal saline. He is of the opinion that this soap solution is distinctly bactericidal. Reynolds et al[39] studied forty-four cases in which the débrided wound was flooded with iodine and alcohol before closing, and forty-four cases in which it was not. Their analysis of these cases showed a greater incidence of infection in the wounds treated with iodine (18.1 per cent as compared with 13.1 per cent). This, they state "is explained on the assumption that the use of iodine resulted in the death of a sufficient number of cells to encourage infection." Eloesser, reporting on "practical experience in the Spanish civil war," makes the comment that "especially noticeable was distrust in chemical antisepsis. Irrigations, Dakin's tubes and the complicated ritual of antisepsis that ornamented military hospitals in 1918 were unused or forgotten. Their place was taken by extensive incisions and plaster-of-Paris splints."

### Wound Treatment

Opinions vary widely on the proper management of the wound after débridement. To quote Reynolds et al., "such diversity of opinion not only indicates the lack of an entirely satisfactory method but emphasizes that whatever the method is, it is good in the hands of those who are familiar with its technic." Cannaday advocates primary skin closure with lateral incisions to relieve any undue tension. In a questionnaire sent to about thirty-three men, Cannaday found that the majority favored débridement and primary closure of the wound. This form of wound management is also used in most instances with local implantation of sulfonamides. Sherman[41] and Kreuscher[28] are among those who are partial to sodium hypochlorite solution irrigation of the wound through Carrel tubes. Orr[36,37] proposes open drainage with petrolatum gauze and infrequent dressings.

### Reduction and Immobilization

Some men[13,36,45] contend that better results can be obtained if adequate reduction, even in the presence of infection, is carried out immediately after débridement. Orr is of the opinion that reduction of a fracture depends on traction more than any other factor. He advises that sufficient traction be applied at the time of operation, and that skeletal pins, fixed in the plaster-of-Paris cast, be used to maintain length and position.

With regard to internal fixation, all surgeons do not agree. Some take the stand that it is best not to insert a foreign body if it can be avoided. Others favor this procedure in certain cases. Where internal fixation is resorted to, the devices used vary from small screws to large plates, and the metals from which they are fashioned vary too. Sherman describes a new stainless steel which, he states, has all the physical properties of vanadium and will not corrode in the presence of sodium chloride or sodium hypochlorite solutions. In his opinion it is superior to vitallium. Most traumatic surgeons, however, do not concur in this opinion. Venable and Stuck[47] feel that only vitallium thus far is sufficiently passive in body fluids. They are also encouraged by their experiments with 19-15 steel which,

they say, seems to hold promise of a malleable yet passive alloy. Murray,[33,34] who uses a 19-9 chrome nickel stainless steel, emphasizes that the metal selected should be able to stand the strain of active function. He, as well as Berg[1] and others, is of the opinion, however, that the technic is more important than the composition of the metal used. And Thomson expresses the same feeling when he says that the occasional operator on fractures should not attempt internal fixation. According to him, "one who attempts such measures in surgery must be master of the most meticulous surgical technic. Not only must he stock the various sizes and types of plates and screws and have the proper tools with which to handle the fragments, plates, screws, nails, wires and pins but above all things he must have profound experience and knowledge of how to use them."

Rigid postoperative fixation is regarded by most traumatic surgeons as an important factor in subsequent functional activity. The means for assuring adequate external fixation varies from splints of all sorts and different types of traction apparatus to simple plaster casts. Eloesser stresses accurate and careful molding of the plaster cast, and believes that "to pad plaster with absorbent cotton or some such material is to frustrate the purpose of plaster." Some surgeons recommend that plaster casts be adequately fenestered to allow for constant observation of the wound and for dressings. Others frown on such a procedure, maintaining that each time the wound is distributed there is additional danger of infection. Cohen and Schulenberg,[8] who treated 266 men with gunshot wounds of the extremities evacuated from Dunkirk, state that in this group four wounds in which gas was actually present and *B. welchii* was cultured were enclosed in plaster yet gave no cause for anxiety later. They look upon continuous pain and fever with edema of the fingers or toes as reliable signs of inadequate treatment or severe supervening infection. Cohen and Schulenburg also obtained excellent results in 30 soft tissue wounds treated in plaster.

The largest recent series of compound fractures was reported by Trueta[46] who applied the Orr treatment (immediate reduction, open drainage, plaster-of-Paris fixation) to 1,073 patients during the hostilities in Spain. With this treatment he got "good or satisfactory results" in 976 instances and "bad results" in 91. There were six deaths in his series. In a letter to Orr, Trueta wrote that under his insistence the method was put into practice in the army 10,000 times, and that "the gas gangrene that made so many victims suffer at the beginning of the war," had then almost disappeared.[37]

### Chemotherapy

*Tetanus Injections.*—The administration of tetanus antitoxin is universally recommended as a routine prophylactic measure in civil practice. Crossan[10] points out, however, that one prophylactic dose is not enough. He states that he had just had on his "service a second case of tetanus in two years in spite of the fact that the patient had a prophylactic tetanus antitoxin." McKim[31] agrees that a second dose is of value.

Simon and Patey,[42] who observed 14 cases of tetanus among a total of 1,900 wounded, recommend a daily serum dosage of 80,000 to 120,000 units during the first few days, and a lesser amount later. They are of the opinion that sympathetic infiltration is indicated in cases in which peripheral pains or pain in an amputation stump appeared when the tetanus seemed to improve. They treated successfully two patients with pain in a lower extremity stump by infiltration of the lumbar lymphatic system and one patient with pain in an arm stump by infiltration of the stellate ganglion. A total of four to six infiltrations may be given, two a day, and about 20 c.c. of a 1 per cent novocain solution is used for one infiltration.

Now with the advent of widespread war, immunization against tetanus has become of vital importance. Newhouser[35] and others feel that the alum-precipitated tetanus toxoid possesses much greater antigenicity, and because of this it is preferable to the plain toxoid. Hall[16] states that alum-precipitated tetanus toxoid is now routinely used for immunization of all midshipmen at the United States Naval Academy.

*Gas Bacillus Antitoxin.*—Most surgeons also include gas bacillus antitoxin in the routine prophylaxis of patients, and when the wound looks particularly dirty or is badly macerated give a second prophylactic dose. The British Medical Research Council[32] recommends for prophylactic use a polyvalent antitoxin consisting of 3,000 international units *Cl. welchii*, 1,500 international

units *Cl. septique*, and 1,000 international units *Cl. œdematiens*, given either intravenously or intramuscularly. For therapeutic use, they suggest a polyvalent antitoxin consisting of 7,500 international units *Cl. welchii*, 3,750 international units *Cl. septique*, and 2,500 international units *Cl. œdematiens*, given intravenously and repeated as necessary while symptoms of toxemia persist. Specific monovalent antitoxins are suggested for more intensive therapeutic use when the organism has been identified.

*Sulfonamides.*—While it is argued by a few surgeons that the value of the routine use of sulfonamides is still debatable and that sufficient experimental and clinical work has not yet been done, most surgeons feel that these drugs are a necessary addition to the treatment of contaminated wounds. An increasing number of reports now attest to the decrease in the incidence of infection following their use, particularly after local implantation.[5,6,8,18,22,44]

Jensen, Johnsrud, and Nelson,[21] as well as Key and Lembert,[26] found that the local concentration of sulfanilamide is from 80 to 100 times higher than that obtained in the blood stream after systemic administration, and that the action of the drug enclosed in the wound lasts longer. Hawking,[17] in a series of experiments on guinea pigs, noted that "sulphanilamide is absorbed from wounds very quickly (in less than twenty-four hours), giving a high but transitory concentration in the fluids of the wound (1,500 mg. per 100 c. cm.); sulphapyridine is absorbed slowly from the wound (seven to ten days) and its concentration in the wound is low (42 mg.) but prolonged; sulphathiazole occupies an intermediate position, being absorbed in about five to six days and producing a concentration of about 104 mg." In treating patients with compound fracture wounds, as well as suppurating sinuses and various ulcers, by local insertion of sulfanilamide and sulfathiazole up to 5 grams, Hawking[18] noted that the sulfonamide concentration "in the blood after twenty-four hours was rarely above 1.5 mg. per 100 c. cm., and usually it was less than 0.5 mg. per 100 c. cm. Consequently," he concludes, "it seems that this local treatment can safely be reinforced by oral administration of the compound, and that in many cases such reinforcement should be desirable."

Key and Frankel[27] observed that sulfanilamide, sulfapyridine, and sulfamethylthiazol in powdered form "were equally well tolerated by the tissues and that they did not materially affect the rate of healing of wounds in experimental animals. . . . As a result of their observations it was concluded that sulfanilamide was the preferable drug because of its greater solubility, it being approximately four times as soluble in the tissue fluids as was sulfapyridine or sulfamethylthiazol."

Leonard R. Broster, of London, in an address before the American Surgical Association in April, 1941, stated that in the British army sulfathiazole is now being used in place of sulfanilamide and sulfapyridine. According to him, the standard treatment for gas bacillus infection at the present time is débridement, sulfathiazole, and serum injections. In America, Weil[48] is one of the enthusiastic advocates of sulfathiazole, particularly the sulfamethiazole, which he insufflates into the wound. He states that he and his associates "have recently been able to close up compound fractures after introducing perhaps anywhere from 100 to 150 grains," without evidence of infection.

Recent experimental studies show that sulfadiazene, the pyrimidine analogue of sulfapyridine, is less toxic and gives higher blood concentration levels than sulfapyridine or sulfathiazole.[38] This new drug promises to play an effective rôle in compound fractures.

It is generally emphasized, however, that the sulfonamides should not be considered a substitute for careful surgical procedures but an adjunct to them.

### Roentgen-ray Therapy

According to Kelly and his associates,[24,25] roentgen-therapy has not only lessened the mortality from gas-forming infections, but has decreased the need for mutilating operations. They see no contra-indication to its use by a competent radiologist. They suggest that treatment by this means should be given morning and evening over a period of three to five days. Also that it should be "of sufficient voltage to insure penetration of the involved tissue: from 90 to 100 kilovolts on an extremity, 1 mm. aluminum filter, from 130 to 160 kilovolts on the trunk with increased filtration; about 100 roentgens per treatment over each area."[23] They state that "if treatment extends beyond the third day and unless new areas

are being treated, 50 r per port might be sufficient."[24] Cantril[7] points out that "the technique of roentgen irradiation requires the use of large fields and the irradiation of far more of the body than the locally involved area. Gas infection of an extremity," he says, "necessitates irradiation by multiple portals of the entire extremity and the adjacent portion of the trunk." He recommends that all areas be treated two or three times daily, and that treatment be continued as the clinical indications warrant. In some of the cases in his series "therapy was continued over a period of 13 days because of the persistence of crepitus."

Kelly and his co-workers[24,25] analyzed a series of 132 cases of gas gangrene treated by irradiation, and found the mortality rate to be 11.3 per cent. This included cases from their own practice and data collected from various radiologists and surgeons. Smaller series showing favorable results with roentgentherapy have been reported by Williams and Hartzell,[49] Godby,[15] Sewell,[40] and Cantril. On the other hand, Cubbins et al.[12] doubt the value of this therapy. They state that "in 8 cases of proved gas infection that were treated with x-ray without surgery or antitoxin there were 8 deaths." Coleman and Bennett[9] also found the results in a series of fourteen cases of gas gangrene treated with irradiation alone to be disappointing. In neither of the last two series, however, were further details of treatment given.

Caldwell,[4] treating by various means experimentally produced compound fractures of guinea pigs infected with a lethal dose of *B. welchii*, found that wounds "sutured and treated with roentgen rays in varying dosage at different intervals were followed by death in seven of ten animals." From these experiments he concludes that "roentgen-ray treatment has no effect upon the progress of a fulminating type of gas gangrene, but does bring about some localization of the process when given one to two hours after inoculation, and when the animals survive forty-eight hours and longer." Implantation of zinc peroxide paste and suture of the wounds after débridement and irrigation resulted in the survival of four of five animals in his experiments. It is of interest to note that Kelly and Dowell[23] in 1936 stated that they had attemped to do some animal experimentations using guinea pigs. They could not, however, determine anything to their satisfaction. It seemed to them that the pig was too small an animal to inject with the virulent gas gangrene and then attempt to cure with roentgen rays. If a real active strain of gas bacillus organisms was used the infection traveled so rapidly, they found, that it was soon necessary to treat most of the pig, and the combination of general body irradiation left too much undecided. Some pigs got well and some died, and in the end, they said, they determined nothing.

In spite of the encouraging results obtained by some, it was pointed out that the value of roentgen therapy could be estimated conclusively only when large series of cases are made available for study. And most surgeons seemed to feel that this therapeutic measure, like the sulfonamides, should not be used in place of, but as a supplement to, sound surgical measures.

Brailsford,[3] among others, recently called attention again to the fact that gas formation in the tissues can be detected by means of roentgenography long before clinical signs have been produced. According to Williams and Hartzell, the gas in the tissues, which increases steadily in amount, "travels along the fascial sheaths and muscle planes producing a typical, almost pathognomonic appearance."

The work of Maes[29] and his associates is of interest. They observed that woolen clothing is a common source of anaërobic infection, and that gas gangrene might also have a seasonal incidence. Maes urges that "physicians suspect anaërobic infection with production of gas gangrene whenever wounds of the extremities involving muscles have been contaminated with wool or with soil."

### Analysis of Cases

An analysis was made of twenty-five consecutive cases of compound fractures, from 1937 to 1940. Twenty-two were charity patients, treated at the University of Oregon Medical School Hospitals, and three were private patients treated at St. Vincent's Hospital in Portland. There were twenty-one male patients and three female patients, a ratio of 7 to 1. The oldest was seventy-six years of age, the youngest two and a half. The average age was thirty years.

In this series, as in others in the literature, the majority of the patients had some sort of automobile accident. The twenty-five patients had twenty-nine compound fractures, and practically every one of them had one or more addi-

tional simple or comminuted fractures as well as lacerations and bruises of varying severity. Two patients had four traumatic amputations of the terminal phalanges of the hand. The distribution of the compound fractures is shown in Table 1.

TABLE I. COMPOUND FRACTURES IN TWENTY-FIVE PATIENTS

| Site | No. of Fractures |
|---|---|
| Skull | 2 |
| Maxilla | 2 |
| Humerus | 1 |
| Radius | 1 |
| Ulna | 2 |
| Phalanges of hand | 9 |
| Ilium | 1 |
| Femur | 1 |
| Tibia and fibula | 8 |
| Os calcis | 1 |
| Astragalus | 1 |
| Total | 29 |

The interval between the time of the accident and the institution of treatment varied from one to eight hours in the great majority of these cases. Six patients were admitted after initial treatment in another hospital—such as cleansing, débridement, suturing, splinting. One patient was admitted with an ununited fracture of six months' duration.

No single type of treatment was followed in the present series, and more than one doctor cared for the patients. In most instances, however, cleansing, débridement, and copious irrigations with saline were carried out. Some wounds were closed primarily, others were packed open. Plaster casts were applied in thirteen instances, and windows were cut for wound inspection and for dressings. Some means of internal fixation was used in seven cases. In four instances treatment included Dakin's irrigations. Three patients had oxygen inhalations. Use was made, as the need arose, of sedatives, various types of local packs, artificial heat, blood transfusions, intravenous saline and glucose, and other supportive measures. Eight patients were given prophylactic tetanus antitoxin, and seven others were given both tetanus antitoxin and anti-gas-bacillus serum. Irradiation was used in only one instance. Ten patients received sulfanilamide. In one instance the sulfanilamide was supplemented by sulfapyridine; in another by sulfathiazole. In only two instances was sulfanilamide used prophylactically, and in only two instances was the drug applied locally.

Most of the patients had complications of one kind or another, the most frequent being local infection. One patient had persistent hematuria which was traced to a ruptured kidney and which necessitated nephrectomy. One patient developed tetanus and died. Two had osteomyelitis which was satisfactorily controlled. There were two cases of gas bacillus infection. Both patients had a therapeutic amputation. One died, the other recovered after a prolonged and stormy convalescence. The patient who recovered was a twenty-six-year-old man who had sustained a compound fracture of the right tibia and fibula and a simple fracture of the left tibia and fibula. His treatment included first débridement and irrigation, Steinmann pins, a fenestered plaster cast, 1,500 units tetanus antitoxin as well as 2,000 units each *perfingens* and *vibrion septique*. Later, in addition to amputation, he had 10,000 units each of *Cl. welchii* and *vibrion septique* antitoxin, 130 grains sulfanilamide, and one roentgen-ray treatment—450 roentgen units over the posterior aspect and 450 over the anterior aspect of the stump. He was also given blood transfusions and other supportive therapy.

For comparison, ten cases of gas bacillus infection from the records of St. Vincent's hospital in Portland and seven cases from the Sacred Heart Hospital in Eugene, Oregon, were also studied. The results obtained are shown in tables 2 and 3. It will be noted that four of the patients had had prophylactic serum injections. Twelve patients had roentgentherapy, two of whom died. In no instance, however, was irradiation the sole therapeutic measure, and the two patients who died were both elderly, sixty-six and sixty-nine years of age, respectively. One had three roentgen treatments and 30,000 units of serum; the other had one roentgen treatment and 25,000 units of serum. Both had had extensive injuries, and would probably have died in spite of any treatment. Nine patients had sulfanilamide therapy, but this also was in no instance the sole therapy. Of the eleven patients who recovered, four had had amputations because of the severity of the injury, and four had had therapeutic amputations. Three patients recovered without amputation. In view of recent publications, it is possible that the four patients who had had therapeutic amputations might have

TABLE II.—NINETEEN CASES OF GAS BACILLUS INFECTION

| Hospital | Age | Sex | Cause and Site | Incubation period | Serum Units | | Sulfanilamide | X-ray | | Amputation | Results |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Proph. | Therap. | | Trs. | r's | | |
| University | 26 | M | Fr. tibia, fibula* | 2 mos. | 4,000 | 20,000 | 130 gr. | 1 | 900 | T | Recovered |
| | 76 | M | Fr. tibia* | — | — | — | — | — | — | T | Died |
| St. Vincent's | 29 | M | Fr. humerus* | 1 da. | + | — | + | 3 | 288 | T | Recovered |
| | 30 | M | Cut forearm | 1 da. | — | 160,000 | 435 gr. | 9 | 855.6 | N | Recovered |
| | 42 | M | Diabetic, toe injury | 2 da. | — | — | 1,120 gr. | 7 | 681.8 | — | Recovered |
| | 21 | F | Fr. leg* | 5 da. | — | + | 675 gr. | 13 | ? | N | Recovered |
| | 26 | F | Fr. forearm* | 1 da. | — | — | — | — | — | T | Recovered |
| | 20 | M | Fr. ankle* | 4 da. | — | — | — | — | — | T | Died |
| | 58 | F | Lacerated arm | — | — | — | 200 gr. | — | — | — | Died |
| | 20 | M | Abdominal wall | 1 da. | — | — | — | — | — | — | Died |
| | 60 | M | Abdominal wall | 2 da. | — | 60,000 | 360 gr. | — | — | — | Died |
| | 54 | M | Fr. Pelvis | 3 wks. | — | + | — | — | — | T | Died |
| Sacred Heart | 39 | F | Fr. tibia, fibula* | 4 da. | 3,000 | — | 375 gr. | 5 | 500 | T | Recovered |
| | 24 | M | Fr. tibia* | 2 da. | — | 235,000 | 895 gr. | 14 | 1,400 | N | Recovered |
| | 27 | M | Fr. femur | 1 da. | 1,500 | — | 50 gr. | 5 | 500 | — | Recovered |
| | 19 | F | Lacerated knee | 5 da. | — | 40,000 | — | 6 | 600 | — | Recovered |
| | 59 | M | Diabetic | — | — | 130,000 | 400 gr. | 6 | 600 | N | Recovered |
| | 66 | F | Fr. femur, pelvis, tibia | 3 da. | — | 30,000 | — | 3 | 300 | — | Died |
| | 69 | M | Fr. tibia, fibula | 2 da. | — | 25,000 | — | 1 | 100 | — | Died |

*Compound fractures. Note: "T" indicates amputations done to control the gas infection. "N" indicates amputations done because of circulatory disturbance or extent of injury.

TABLE III. THERAPY IN NINETEEN CASES OF GAS BACILLUS INFECTION

| Treatment | No. of Cases |
|---|---|
| 11 Recoveries (57.89%) | |
| Amputation only | 1 (09.09%) |
| Amputation, x-ray, sulfanilamide, serum | 5 (45.45%) |
| Amputation, x-ray, sulfanilamide | 2 (18.18%) |
| X-ray, serum | 1 (09.09%) |
| X-ray, sulfanilamide | 2 (18.18%) |
| 8 Deaths (42.10%) | |
| No therapy | 1 (12.50%) |
| Amputation only | 2 (25.00%) |
| Amputation, serum | 1 (12.50%) |
| Serum, x-ray | 2 (25.00%) |
| Serum, sulfanilamide | 1 (12.50%) |
| Sulfanilamide only | 1 (12.50%) |

survived without such a procedure. While nineteen cases is not a large series, it would seem, as has been pointed out by others, that a combination of accepted therapeutic measures gives the best results.

The average stay in the hospital of the twenty-five patients with compound fractures was sixty days. It should be noted, however, that all but three of them were cared for in a county hospital where treatment as a rule takes longer than in other hospitals.

In spite of the fact that treatment was not uniform or carried out by the same man in all instances, satisfactory results were obtained in nineteen, or 76 per cent, of the cases. In two instances the fracture did not unite. One of the patients subsequently had a sliding bone graft. Another patient, a boy of ten, was discharged from St. Vincent's hospital in apparently satisfactory condition after treatment of a compound fracture of the right femur just above the knee and a simple fracture of the left femur. A year and a half later he was again admitted to the hospital because of a staphylococcic septicemia with osteomyelitis of the right heel. This was followed by multiple chronic osteomyelitis, with the largest focus of infection at the site of the old compound fracture in the left femur.

Four patients died (20.00 per cent). Details of the deaths are as follows:

*Case 1.*—A twenty-four-year-old man was admitted to the hospital on July 4, 1940, about four and a half hours after being hit by a motorcycle. He had a compound, comminuted fracture of the left os calcis and astragalus, a comminuted fracture of the left tibia, and a comminuted fracture of the left femur. His leg had been put in a Thomas spint, and he did not appear to be in shock. Five per cent glucose, however, was given; and roentgenograms were taken.

Under cyclopropane anesthesia the wound on the lateral aspect of the ankle was cleansed with tincture of green soap, hydrogen peroxide, and alcohol; irrigated with large amounts of normal saline; and débrided. The fracture was reduced as well as possible. The wound was packed with vaseline gauze, rubber tissue drains were inserted, and the wound edges were brought together with interrupted silkworm sutures. A short plaster cast was applied to the lower leg, and a window was cut out over the wound. Tetanus antitoxin and anti-gas-bacillus serum were given, 1,500 and 2,000 units, respectively; and "prophylactic sulfanilamide was started."

The day after operation the patient had a slight chill and a temperature of 101.6 degrees. His condition, however, seemed to improve. On the fourth and fifth postoperative days he was given a blood transfusion of 250 c.c. On August 1, twenty-seven days postoperatively, the left thigh was manipulated, and a Kirschner wire was placed through the lower end of the femur in an attempt to correct some of the anterior bowing.

The patient continued to make good progress, and the wound was granulating in. On September 6, however, he complained of soreness of the neck. Three days later he could barely open his mouth or chew. There was no rise in temperature. Muscle spasm and difficulty in breathing developed next. Heavy sedation and large doses of antitetanus serum were started immediately after desensitization. A total of 171,500 units of serum were given—11,500 units being injected around the site of the wound and 160,000 units being given intravenously in normal saline. In spite of the large doses of antitoxin and the usual supportive measures, the patient died on the seventh day of active tetanus syndrome.

The essential postmortem findings were: delayed tetanus infection, bilateral bronchopneumonia, pulmonary edema and hyperemia, focal cystitis and urethritis.

*Case 2.*—The patient was about sixty-five years old, and was admitted to the hospital in coma on February 11, 1940, after having been found unconscious on the street. He had a compound fracture of the tibia and fibula, lacerations of the scalp, simple skull fracture, and concussion of the brain.

Shock was treated, and about two hours later the scalp wound was cleansed, débrided, and sutured. The leg wound was also cleansed and débrided; the fracture was reduced; the wound was closed; and a cast was applied. Supportive measures were instituted. The patient died, however, on February 14, 1940. A postmortem examination was not made. The cause of death was recorded as cerebral concussion, subarachnoid hemorrhage, cerebral edema, rheumatic endocarditis with hypertrophy, dilatation of the heart, pulmonary edema, terminal bronchopneumonia, and multiple traumatic injuries.

*Case 3.*—This patient was in shock practically all the time, and died ten and a half hours after admission to the hospital. He was thirty-four years old, and had a compound fracture of the right ileum; simple fractures of the right tibia and fibula as well as of the right scapula and of the ribs; and laceration of the scalp. A train had hit him, and he had been picked up by the next train that came along. He had been unconscious for three hours, and unable to move for about an hour after that.

Measures were instituted to combat the shock. About three hours later, under local anesthesia, the head wound was cleansed, débrided, and sutured. The wound over the ilium was also cleansed and débrided, and loosely closed with interrupted black silk sutures. The patient's general condition was extremely poor during the entire procedure, which was carried out in his bed. The left saphenous vein was cut, and a cannula was introduced for administration of fluids. Five and a half hours later, however, he expired. Post-mortem examination was not done.

*Case 4.*—The patient was a seventy-six-year-old man who had been struck by an automobile, sustaining a compound fracture of the tibia. The fracture had been reduced and a cast applied. His course, however, had been progressively downhill. Gangrene had developed, and amputation had been advised. One week after the injury, because of financial reasons, the patient was transferred to the University hospital where a Callander amputation of the gangrenous lower extremity was performed. He did not rally, and died two days after admission. Autopsy was not done. The cause of death was given as terminal bronchopneumonia and recent amputation.

## Summary

A review was made of recent literature on the treatment of compound fractures. It was noted that these fractures are now generally regarded as emergencies, and that the success of their treatment is believed to depend largely on the duration of the interval betwen the time of injury and the operative care. First aid treatment is stressed, and an educational program in adequate first aid measures is advocated for those most likely to handle the patient at the scene of the accident. Emphasis is placed on meticulous and gentle débridement. The use of strong antiseptics has in most cases been supplanted

by irrigations with large amounts of saline solution. Internal fixation is practiced by some surgeons, and frowned upon by others. Some advocate primary closure of the wound, if too much time has not elapsed after the injury; others favor packing the wound open or irrigating it with hypochlorite solution. Rigid external fixation is stressed. The prophylactic use of tetanus antitoxin and anti-gas-bacillus serum is advised. Favorable results have been obtained with irradiation in the treatment of gas bacillus infections. And an increasing number of surgeons advocate the use of sulfonamides.

Twenty-five consecutive cases of compound fractures have been analysed. There were four deaths (20 per cent). No single type of treatment was followed. One patient died from tetanus. Two patients developed gas bacillus infections. Study of these and 17 additional cases of gas infection showed a mortality rate of 42.10 per cent in 19 cases.

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# THE PRIMARY TREATMENT OF WOUNDS*

SUMNER L. KOCH, M.D.
Chicago, Illinois

WHAT I have to say is not new and not dramatic. It is a reiteration of surgical principles, so simple that many of you will say, "Why repeat something that we all know so well?"

The answer is that it requires repetition of basic surgical principles to help us maintain a proper perspective and a judicial attitude toward the New Deal that is constantly being urged upon us for consideration and adoption. It is easy to desert the highway that leads us to our destination with certainty when there are many alluring bypaths that promise an easy and rapid route to the desired objective.

The surgical principles that seem to us of basic importance and that have stood the test of time in the treatment of compound injuries are six in number:

1. Not to add contamination to the open wound.
2. Not to add trauma.
3. At the earliest possible moment and by the simplest possible method to transform the contaminated wound into a clean wound.
4. If the latter can be accomplished within a few hours of the time of injury, to repair the injured structures and close the wound.
5. If the optimum time has passed, to cleanse the wound with the same care one would use if it were to be closed, but to omit repair of injured structures, and, in severe cases, closure of the wound.
6. Whether injured structures are repaired immediately or not, to secure rest for the injured part with the aid of a dressing that immobilizes it and provides an even and constant pressure over the wound area.

I should like to discuss each of these principles very briefly.

1. *Not to add contamination to the open wound.*

Evidence is constantly accumulating that indicates the important sources of infection of open wounds. The most important in our judgment are the mouth and nasopharynx of individuals who harbor virulent organisms; in other words individuals who are "carriers" and who may come in contact with the injured patient. Hare[1] has estimated that 7 per cent of healthy individuals harbor virulent streptococci in the mouth and nasopharynx, and he has concluded from a careful study of reports and statistics from the Great War that during that period the most important source of infection of open wounds was the mouth and nasopharynx of first aid workers, orderlies, nurses, doctors—of any of the many individuals who cared for patients with open wounds. Our experience has convinced us of the truth of Hare's conclusions. We are much more concerned over the possibility of contamination of open wounds from the uncovered mouth and nose of individuals working over the patient than we are about infection that may have been carried into the wound by the traumatizing agent or that may have been present on the patient's skin at the time of injury.

How can one avoid adding contamination to the open wound? By avoiding examination, probing, the application of ligatures; by simply covering the wound completely with a sterile dressing, applying a pressure bandage and an immobilizing splint *immediately after the injury has been sustained.*

2. *Not to add trauma.*

It is generally admitted that it is unsportsmanlike to attack a man when he is down. We sometimes forget that rule when we are confronted with an open wound in which delicate fragile tissues, which normally are protected by a firm and resistant covering, lie exposed to the open world. Thinking only of the possibility that bacteria may be present in the wound and anxious to destroy them we flush or irrigate or paint the vulnerable tissues with chemical solutions that may destroy a few bacteria, but that destroy just as certainly the living tissues which are actually our strongest defense against bacterial infection. I need only recall to your mind the many experiments that show the constant presence of

*From the department of surgery, Northwestern University Medical School. Abstract of a discussion presented before the Minnesota State Medical Association, St. Paul, Minnesota, May 27, 1941.

pathogenic bacteria in the washings from clean surgical wounds and that in spite of this contamination such wounds constantly heal by primary union.[2] It might be well to recall to our minds Halsted's observation that if bacterial cultures are injected in the normal peritoneal cavity infection does not take place, but if devitalized tissue is present peritonitis invariably follows. If we can avoid adding injury—mechanical or chemical—to that which the patient has sustained the chance of securing a successful result is definitely increased.

3. *To transform the contaminated wound into a clean wound.*

In our judgment there is no method so effective and none which carries so little risk of injuring the exposed and vulnerable living tissue as the use of plain white soap and sterile water applied with soft cotton and gloved hands, gently but thoroughly for a period of not less than 10 minutes and followed by prolonged irrigation of the cleansed wound with warm saline solution. For a number of years now we have used nothing else in the pre-operative preparation of open wounds except for the occasional preliminary use of a fat solvent, such as benzine, to remove an excess of grease. With the use of this method our results have improved steadily, and we would not willingly return to the use of antiseptics in the pre-operative preparation of compound injuries.

Although the excision en masse of a thin layer of tissue from the surface of the wound is theoretically an ideal method of converting a contaminated wound into a clean wound, practically such a method is possible of execution only in a minority of cases. Traumatizing agents do not often stop short of nerves, tendons, important blood vessels and bones. One cannot sacrifice vital structures to make complete wound excision possible, and too often the attempt to carry out excision results only in a makeshift procedure and secondary contamination of freshly made raw surfaces from contaminated vital structures in the deeper portions of the wound.

4. *Repair of injured structures and closure of the wound.*

If the open wound can be converted into a clean surgical wound it is logical immediately to repair the injured structures and close the wound. "If" it can be accomplished depends upon the time that has elapsed since the injury that was sustained, the type of first aid care that has been given, the extent and character of the injury, and the patience and care the surgeon is willing and able to render. If all the conditions are favorable, immediate repair and closure can usually be accomplished with every likelihood of a favorable outcome. How much skillful care immediately after an injury has been sustained can contribute to a successful outcome has been emphasized and demonstrated particularly in the field of maxillofacial surgery. It is only logical to say that the same principles advocated by the maxillofacial surgeons apply to injuries of every part of the body. If we delay the reduction of fractures of bone, of tendons, of nerves and soft tissues until inflammatory reaction and fibrous tissue formation have resulted in some degree of permanent and irreducible deformity the unhappy results may not be as apparent in some parts of the body as they are in face and jaw, but the most favorable moment for surgical treatment has been lost just as certainly and irretrievably.

5. *Care of the wound after some hours have passed.*

If more than two or three hours have elapsed before the injured patient comes to the surgeon the possibility of transforming the contaminated wound into a clean surgical wound is definitely diminished. In such a case we would cleanse the wound just as carefully as in the first instance, reduce fractures of bone with the same care, but not attempt reduction of soft tissue fractures until wound healing is complete. If in such a patient no wound infection develops, repair of injured structures can be accomplished within three or four weeks and under the most favorable conditions. To attempt, however, the surgical dissection essential for repair of injured muscles, tendons and nerves when pathogenic bacteria are beginning to invade the body tissues is to court disaster.

6. *Rest for injured tissues.*

"Inflamed and injured tissues need rest" just as truly today as in the time of Ambroise Paré, Baron Larrey and Hugh Owen Thomas. Orr has helped us to a new understanding of its importance, and British surgeons today are rediscover-

ing the meaning of this often neglected surgical principle.

Philip Wilson said recently in an address before the American Surgical Association that British surgeons were agreed that the advantages of the closed plaster method of treating compound fractures after securing complete reduction of fractured fragments lay in uninterrupted rest, freedom from the constant danger of contamination during every change of dressings and in the helpful effect of uniform pressure over the injured limb. A constant pressure, not constricting or rigid but with some degree of elasticity, is of definite value in aiding the return flow of blood, and so helping to maintain an adequate circulation.

If in our treatment of compound injuries, whether they be lacerated wounds, compound fractures or extensive burns, we constantly ask ourselves if our methods are consistent with basic and time-tested surgical principles we shall not go astray in our treatment.

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## HUMAN BLOOD SERUM: ITS PREPARATION AND USE*

ROBERT B. TUDOR, M.D. and URSULA JANEZICH, R.N.

Hibbing, Minnesota

HUMAN blood serum has been used as a blood substitute for many years. Rous, Wilson,[20] Strumia,[22] Kallius,[7] Levinson,[13] and Elliott[4] are some of the pioneers in human serum transfusions. According to Levinson, there are no great differences between plasma and serum as transfusion fluids. Plasma, however, cannot be kept over a long period of time because fibrinogen gradually precipitates out in the form of fibrin veils and granular precipitate and requires filtration or centrifugation and clearing before administration. After most or all of the fibrinogen has precipitated out, the solution consists essentially of serum diluted with sodium citrate. If the original intention of the laboratory is to prepare either serum or plasma, serum is preferable.[13]

Blood plasma is resolved by clotting into serum and fibrin. The fibrin forms only .2 to .4 per cent of the total weight of blood. The serum contains in one hundred parts, eight to nine parts of solids, of which seven to eight parts consist of proteins, while the salts make up one part. The proteins probably do not exist side by side in the serum but are combined to form serum protein which acts as a whole.[1] The chief salt present in the serum is sodium chloride, and next to this comes sodium bicarbonate, and besides these two we find traces of potassium, sodium, and calcium chlorides and phosphates. Traces of fats, cholesterol, lecithin, glucose, urea, amino acids and other nitrogenous extractives are constantly found in the serum. The fats are much increased after a meal rich in them and may give the serum a milky appearance. The yellow color of the serum is due to the presence of bilirubin, carotene, and xanthophyll. Blood serum contains thrombokinase, prothrombin, and thrombin. Thrombin rapidly disappears from the blood serum in two to three days. The disappearance of thrombin from serum is due to its combination with serum protein. This combination can be broken up by the addition of small traces of acid or base and the serum reactivated.[21] The plasma prothrombin in preserved blood decreases very gradually, reaching the 50 per cent level at the end of about three weeks.[24]

We have tried to find some method of preparation which would allow the general practitioner the use of this type of therapy.

We have used serum exclusively. Centrifugation, necessary for the preparation of plasma, is too complicated for the general practitioner to attempt and as far as we can see, is unnecessary.

Moon has shown that secondary shock essentially results from an uncompensated disparity between the volume of blood and the volume capacity of the vascular system. The most im-

*From the Adams Hospital, Hibbing, Minnesota. With the collaboration of Drs. B. S. Adams, C. Jacobson, C. N. Harris, C. S. Raadquist, M. F. Hayes.

portant factors in its production are capillary atony and tissue anoxia. The capillary atony caused by agents or conditions injurious to the capillaries, results in loss of plasma protein into the tissues, reduced blood volume, reduced volume flow, reduced delivery of oxygen and tissue anoxia. The tissue anoxia furnishes products of deficient oxidation which in turn produce capillary atony. Efforts to interrupt the cycle should be directed toward the restoration of the blood volume.[16]

Loss of erythrocytes in severe hemorrhage is seldom a vital factor. The sudden and marked diminution in circulating blood volume, however, is of grave and serious significance.[14]

Shock resulting from extensive trauma or burns is caused by absorption of substances released from injured tissues and by the effects of these on the visceral capillary bed.[16] The capillaries become abnormally permeable to the plasma protein which leaks into the tissues causing a concentration of the blood and consequent secondary shock. Loss of protein is clearly an important and serious effect of severe cutaneous burns. This loss affects not only tissue protein but also plasma protein. It seems likely that many if not all of the general manifestations of severe cutaneous burns are connected with this loss.[5]

In acute glomerulonephritis, nephritis with a nephrotic tendency, or lipoid nephrosis, the most important factor in reducing the patient to a state of cachexia is the loss of plasma protein through the damaged capillary walls.

The use of convalescent blood serum in the treatment of severe infectious diseases has been a procedure of value for years.[12]

The ideal fluid then for the treatment of secondary shock due to trauma or severe burns, acute hemorrhage, hypoproteinemia, and acute infectious diseases, should meet the following requirements:

1. It should be easily prepared.
2. It should be easily preserved and stored.
3. It should be low in cost so it can be made available to all.
4. It should contain the necessary elements to maintain the colloid osmotic pressure of the blood.
5. It should contain specific antibodies.

Human blood serum is that ideal fluid.

There are many drawbacks to the use of whole blood in emergencies. Before a blood transfusion can be accomplished, certain procedures have to be done. The patient must be grouped and the donor must be grouped, and then they must be cross matched. Wasserman testing must be done. Even when these procedures are done by a trained personnel, they are time consuming. In this time interval the state of shock may become irreversible and fatal.

In an emergency the use of stored blood is an excellent measure, although evidence is accumulating that stored blood is inferior to fresh blood, especially if the storage has been for more than seventy-two hours.[8] Even with the use of stored blood, there still remains the unavoidable delay due to the necessity for typing the patient's blood, performing compatibility tests, and filtering the stored blood.[14] Reactions following blood transfusion are still relatively frequent.[9,15]

As Levinson points out, there are two handicaps that restrict the usefulness of blood transfusion, unavoidable delay before administration and reactions, both primarily due to the corpuscular elements of the blood.[14]

The crystalloid solutions are of only temporary beneficial effect. They increase blood volume but owing to the fact that they do not remain in the circulation their beneficial effects are only transient. When such crystalloid solutions diffuse out of the abnormally permeable capillaries, the increasing edema is decidedly harmful.[13]

Human serum is the ideal fluid to use in the treatment of the secondary shock due to trauma or severe burns, hemorrhage, and hypoproteinemia. Because of its antibody content it also has a wide field of usefulness in severe infectious diseases. We don't believe that anyone yet has evaluated correctly the true worth of human serum in the treatment of severe scarlet fever, measles, mumps, meningitis, nephritis, et cetera.

We have given human serum in forty-three infusions to eighteen individuals. We have used the serum indiscriminately, making no attempt to pick any special type of case. We have tried to prove or disprove the advantages and disadvantages of serum by using it in different therapeutic problems.

Temperatures were taken when the serum was given and then one hour after the serum had been discontinued. In a few instances blood pressures were taken in the same manner. The

nurses were told to record any subjective symptoms the patients complained of following or during the administration of the serum. In no instance was there any subjective discomfort which we felt was due to the serum infusion. In ten patients the temperature rose one hour after the infusion. The greatest rise was 2.4 degrees. The temperature dropped in eleven patients following the serum administration. The greatest drop was 1.0 degree. Sixteen patients had no change in their temperatures after the serum had been given. In three individuals the blood pressure rose after the infusion. In one patient the blood pressure fell one hour after the transfusion, to rise again during the second hour.

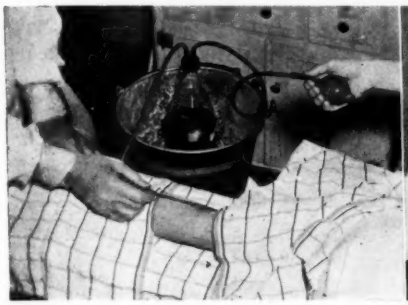

Fig. 1.

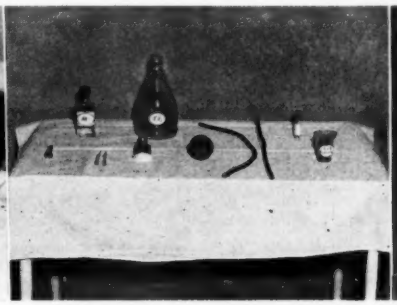

Fig. 2.

Fig. 3.

We had three deaths in our series. None of these deaths was in any way related to the serum infusion. All came to necropsy. One patient died with a gangrene of the ileum which he developed following a cholecystectomy, another in secondary shock following a resection of the cecum, and a third with general peritonitis and empyema following a ruptured appendix.

From our limited experience with human serum, we feel that it should be used widely in those postoperative courses that are prolonged for one reason or another and leave the patient with a generalized capillary atony and a tendency to the formation of edema. In these patients the serum seems to best stimulate their circulatory systems and rid them of surplus body water.

We feel, with Elliott,[4] that the indication for transfusion in pediatrics is usually for the serum rather than for whole blood. We feel that it is indicated early in the course of the acute diarrheas and upper respiratory infections of infants. We gave it intramuscularly in these instances.

Two patients were of especial interest.

*Case 10.*—This patient was a boy, aged eight, who came to us with a typical nephritis with a nephrotic tendency. When the diagnosis was made, he was immediately started on human serum. Diuresis began at once and his blood pressure also began to drop. After eight infusions all the patient's edema was gone, and the blood pressure was normal. The boy's usual weight was fifty-one pounds. Following sixty days of bed rest, he weighed forty-nine pounds. We believe the serum was responsible for keeping him in such good physical condition.

*Case 45.*—This patient was a boy, aged eighteen, who had the most toxic scarlet we have ever seen. When we first saw him, he had been on sulphanilamide and sulphathiazole for four days. Following an infusion of 100 c.c. of human serum, the boy's temperature rose from 103-R at 7 P.M. to 104-R at 9 P.M., then declined successively to 102-R at 1 A.M., 101-R at 5 A.M., 100-R at 7 A.M. and 99.2 at 11 A.M. The following day he was given 100 c.c. more of the serum. His temperature, which had risen to 101, came down to 100 at once. The following day the temperature became normal, and it never went over 98.6 again during his convalescence.

Human serum can be prepared easily, preserved indefinitely by the addition of merthiolate or sulphanilamide,[3,18] and shipped any place with no deterioration of the product. Compatibility tests may be omitted because of the fact that neutralization of agglutinins by both tissue and serum of the recipient provides a wide margin of safety in protecting the recipient's red blood cells from the infused agglutinins.[11] A low agglutinin titre can be prepared by pooling a large number of serums of varying blood groups.[11] Human serum in contrast to animal serum does not sensitize human subjects nor does it produce anaphylaxis or serum sickness.[10]

Our serum is prepared simply, easily, and

cheaply, in the following manner. Our apparatus consists of an Abbott intravenous bottle, a two-hole bakelite cap that fits the bottle, two lengths of rubber tubing, a transfusion needle which fits into one of the pieces of tubing, and a rubber bulb which fits into the other tubing (Figs. 1 and 2). Fifty cubic centimeters of a 1-1000 solution of merthiolate are first placed in the intravenous bottle for each five-hundred cubic centimeters of blood to be withdrawn, giving a final concentration of 1-10,000, and the transfusion needle and rubber tubing connecting it to the intravenous bottle are then washed out with a few cubic centimeters of 2.5 per cent sodium citrate. The bottle is then placed in a pail containing ice and water, and the needle being inserted in the vein of the donor, the blood is allowed to run into the bottle. A clamp in the bottom of the pail holds the bottle securely in the ice bath during the transfusion (Fig. 3). In this way the blood is cooled as quickly as possible to a temperature of 5°C. De Gowin[2] found that this procedure effectively prevented initial hemolysis of the blood. When the required amount of blood has been withdrawn, the tubing is disconnected from the intravenous needle and the last five cubic centimeters of blood are allowed to run into a Wassermann tube and sent to the State Board of Health immediately. The bakelite cap is then removed from the bottle containing the blood, and a sterile metal cap is screwed onto the bottle. The bottle, after being labeled, is placed in a refrigerator at 5°C. After forty-eight hours, the supernatant serum is withdrawn from the bottle, using the same apparatus and sterile precautions as were used in drawing the blood from the donor. After all the Wassermann reports have been received, serums from different individuals are pooled and allowed to remain together for from two days to weeks, depending upon the demand for serum. The serum is used diluted with 400 c.c. of 5 per cent dextrose in physiological saline and 50 c.c. of 1-1000 solution of merthiolate. The intravenous bottles containing this mixture are kept in a room adjacent to the operating room so they can be used at an instant's notice. When we first began using serum, we used the serum undiluted, but we have found the dilution with dextrose in saline a more satisfactory way to administer it.

We believe that human serum is the ideal fluid for use in secondary shock due to trauma or severe cutaneous burns, acute hemorrhage, hypoproteinemia, and in severe acute contagious diseases. We believe that every man practicing medicine should have human serum at his disposal. It has not been used as much as it should be by the general practitioner because of its apparent high cost and the apparent complicated processing necessary for its production. We believe we have a simple, easy, cheap method of preparing serum which will furnish the physician with a therapeutic aid which once used he will not be without.

We agree with Levinson,[13,14] that human blood serum is the ideal blood substitute. We have used much smaller amounts of serum in transfusions than has Levinson. We will possibly increase our amounts after we have used more of the serum and have had a wider experience. We have rarely had to give more than 100 c.c. of diluted serum at any one time before securing the desired effect.

Strumia[22,23] insists that the intravenous use of serum is accompanied by severe reactions. No reactions were observed in our forty-three infusions reported. Levinson reports one local reaction consisting of pain along the vein into which the serum was being given, in a multitude of infusions to forty-seven patients.

## Summary

1. Human serum is recommended to the general practitioner for more general use.

2. The therapeutic indications for its use are reviewed; secondary shock due to trauma or burns, acute hemorrhage, hypoproteinemia, and acute contagious diseases.

3. It is suggested that serum be used in the treatment of the acute diarrheas and upper respiratory infections of infants and as a more frequent agent in prolonged postoperative convalescence.

4. The drawbacks to whole blood transfusion are mentioned.

5. Eighteen patients who received forty-three transfusions of human serum are reported.

6. A simple cheap method of preparing and preserving human blood serum is described in detail.

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## PSYCHOSOMATIC MEDICINE*

**L. R. GOWAN, M.D., M.S.**
**Duluth, Minnesota**

THE word "functional" used as a medical term to describe a symptom or physical disturbance has been greatly abused by the medical profession and has led to careless thinking and wasteful inactivity on the part of many physicians. It is a term used too frequently in cases of obscure etiology, those unresponsive to treatment, and others that recur with an almost willful stubbornness. It covers a multitude of sins. It has come to imply something that the word literally does not mean. A functional illness should mean an illness whose symptoms are due to a disturbance of the function of an organ, or group of organs, but as used by the average physician it does not mean that, but has come to imply a condition for which no organic disturbance can be demonstrated. Since no abnormality can be shown by physical examination, x-ray, microscope or test tube, the attending physician appeases his conscience, bolsters his pride, and obtains a diagnosis by labelling the condition "functional," a label that has come to mean in most instances that the condition is considered nervous in origin. This state of affairs would not be so bad if the physician, upon making the diagnosis of a functional condition, would realize that conditions do not arise without a cause, and would diligently try to find that cause. With few exceptions, this is not done. It requires too much time, or the condition is not considered serious enough, to help the patients find their way to someone who is interested, and whose business it is to take the time.

The so-called functional case is usually treated entirely symptomatically, or else dismissed with the statement, "You're just nervous, go home and forget it." The patient then drifts from one regular practitioner to another, finally falling into the hands of a badly trained irregular. If the condition is organic, much valuable time may be lost, if psychogenic, the suggestive therapy handed out in huge doses in an objective way may temporarily relieve the condition, only to have it return because the real foundation of the symptom has not been uncovered, but has been covered up, even more deeply.

The acceptance of the term "functional" as opposed to "organic" has misled medical practitioners from the realization that psyche and soma are inseparable. If by functional we mean a condition having no organic basis but one caused by emotional disturbances, would it not be better to use the word psychogenic, thereby at least implying that the condition has a genesis, that it started from something. However, it must be remembered that a truly functional con-

*Read at the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 26, 1941.

dition may be present and not be psychogenic in origin.

After accepting the word psychogenic as meaning a condition having its origin in the emotional sphere, let us be careful lest we still regard psychic and somatic as having no real relationship. The pioneer work of Cannon and his long years of physiological research have pointed out in convincing fashion the effects of emotions on bodily functions. In a recent paper[2] he expressed the opinion that the medical profession has not recognized in a practical way the nervous strain of modern life as a cause of disease, and he emphasizes the importance of regarding man as a mind-body unity. He discusses the ways in which success may be achieved in the treatment of emotional disorders by efforts to affect the emotions so that they are no longer harmful in the physiological sense, and will, therefore, cease to produce tension and turmoil, responsible for many symptoms causing distress and disability.

Within the past decade or so the epoch-making researches of Cannon have been applied by many workers who have brought about a practical interpretation of the inner relationships of the psychological and physiological. Not only has it been shown that emotional disturbances produce symptoms of organic disease, but it has also been shown that emotional disturbances in time actually cause organic disease, and if the treatment of the psychic disturbance is successful at a stage of the organic disease development that is not irreversible, the organic disease improves and even disappears.

Dunbar[3] has collected and coördinated over two thousand papers dealing with the effects of emotional disturbances on bodily functions and the production of bodily changes. As a result of her work and others, rapid and increasing interest in the psychosomatic approach in the understanding and treatment of disease has been shown and the terms psychosomatic and psychosomatic interrelationships have arisen and been accepted in medical literature. Many of the larger medical centers and hospitals have programs under way with the purpose in mind of coördinating various departments of medicine with psychiatry so that the interrelationship of psychic and somatic etiology may be better understood. Thus the patient is treated as a whole, rather than as a group of parts. This study is not being carried out with the idea in mind of determining what organic-like symptoms are psychogenic in origin, or what psychic symptoms are organic in origin, but rather to determine what part the psychic factor has in the etiology of an organic disease, or in the prevention of adjustment of the patient to an organic disease. This approach likewise seeks to determine in what way the somatic disease influences the emotional adjustment of the individual, in what way the psychic preparation of the patient aids in the successful carrying out of a surgical operation, in what way a psychic disturbance delays the convalescence of a physical illness, in what way the presence of a somatic disease so disrupts the social, economic status, and environment of a previously well adjusted patient so that an entire new plan of living is necessary.

Psychosomatic medicine is not a new branch of medicine. It belongs to all fields of medicine. It must be absorbed by all branches of medicine. An adequate understanding of psychosomatic interrelationships, and a conscious following of its principles should serve to coördinate the various branches of medicine. It should do away with many of the evils of specialization; a condition that seems necessary to modern scientific medicine.

That the psychic component in the etiology of and its influence on the treatment of all types of diseases is an important one is evident by many excellent papers in various medical fields.

The scope of this paper does not allow an extensive review of the related literature; however, a citation of some of it should be of interest.

Moschcowitz[6] has listed several syndromes which he believes to be psychogenic in origin, including such conditions as spastic and mucous colitis, cardiospasm, gastric and duodenal ulcers, essential hypertension and exophthalmic goiter. He states that such diseases are but exaggerations of normal functions, and that in the evolution of such organic diseases there are three stages: (1) the constitution of the individual; (2) the fixation of an exaggerated function of the organs affected; (3) the development of a lesion.

Fetterman,[4] in discussing the correlation of psychic and somatic disorders, states that a common factor in obscuring an organic disease by psychic complaint is a marked fear reaction. A local disease process may so alarm the patient that fear reaction leads to self study, insomnia, trembling, weeping, and such changes in mood

as to almost hide the organic disease. He further states, "It is in the neuroses that the vegetative factors dominate the picture. The essence of a neurotic illness is some emotional disturbance, often fear, and the viscera are the voice and vocabulary of the emotions. Conflict causes dizziness, discouragement, disturbance of the cardiac cycle; despair deranges digestion; shame alters the skin color; tension induces tremors; indecision brings about insomnia; fear spreads through the autonomic system to upset any and all of its functions. Through the diencephalon, and the vegetative pathways, every human emotion is physiologized."

Weisenberg[9] and his co-workers, in reporting the case histories of fourteen patients labelled neurotic, whose illnesses later proved to be organic, point out that the patient may have been neurotic in the past, and when he acquired a new illness, it was grouped with the previous neurotic record. They state that Head has shown that the viscera have cortical representations, and a visceral disease may cause psychic symptoms. Further that in certain illnesses there may be toxic factors that disturb the emotional balance. That frequently patients refuse adequate diagnostic study, and many patients are diagnosed as neurotic while the organic illness is still in the premanifest stage. The organic illness may be overshadowed by psychic complaints or by social catastrophe. The true cause of the patient's symptoms may be covered up because of the fact that the psychic disturbance is so evident that the physician's attention is distracted away from the underlying organic disease.

Robinson,[8] in a paper entitled, The Relation of Emotional Strain to Illness, summarizes as follows: "(1) A study of hospital patients with special reference to their social and personal problems has demonstrated that emotional strain frequently causes an important component of illness, deserving consideration in diagnosis and treatment. (2) A patient with an apparently unalterable organic disease is reported whose symptoms disappeared with the relief of emotional strain. (3) The significance of this case as an example of psychogenetic symptoms in organic disease, and the method of study and treatment used are discussed. (4) The need of greater consideration of the patient as a total individual in order to gain a better understanding of emotional disturbances as related to illness in hospital practice is emphasized."

Meyer,[5] in referring to general somatic symptoms which spring from mental causes and the importance of their recognition and treatment, states: "These disorders are common enough to make it a responsibility of any physician to learn something about mental causes and their workings. It is not likely that the general practitioner and the internist will be able to do their best without such knowledge. It will have to be acquired by a study of these events when and where they occur, with attention to the situation and to the facts that make reaction excessive."

Palmer,[7] in discussing the subject of functional bowel, states in his conclusion: "The important point is a recognition of the broad aspects of the varied symptomatology of the 'functional bowel,' and an approach designed to determine; first, whether or not organic disease exists; second, the significance of the disease in relation to the life of the individual; third, the determination and evaluation of the various factors involved in the functional disturbance in the case under consideration, and, finally, the planning of an intelligent program of rest, exercise, diet, medication and mental hygiene in order to bring about a more satisfactory adjustment between the individual and the environment, both internal and external."

Bernstein,[1] in the conclusion of his paper entitled, Skin Diseases from an Emotional Standpoint, states: "I would like to re-emphasize the importance of psychotherapy in the treatment of skin diseases of emotional origin. All other treatments are accessory to this. A dermatologist should have a working knowledge of neurology and psychiatry, psycho-analysis, allergy and endocrinology, and when he feels that his own knowledge of these fields is insufficient, he should not hesitate to consult a specialist in these fields."

It is, of course, self-evident that the neurotic individual may have an organic disease, entirely unrelated to the neurotic complaint from a symptomological or etiological standpoint, but it can hardly be said that there exists a neurotic individual with an organic disease, whose organic disease is not influenced by the emotional instability, nor can it be said that an individual suffering from a neurosis can possess an organic

disease without that disease affecting the neurotic manifestations.

It is important to remember that organic disease may cause neurotic-like symptoms, as well as that psychogenic disturbances may produce organic-like symptoms. Many physicians believe that all neurotic patients finally show organic disease as the cause of their symptoms. All neurotic patients may not have organic disease as a basis for their neuroticism, but psychiatrists are frequently consulted by patients whose complaints sound like psychogenic illness, but who present organic disease. Once again is stressed the importance of considering the individual as a whole, thereby avoiding the oft repeated mistake of focusing one's attention on what seems to be the important symptom or finding, and overlooking, in the background, the real basis of the illness.

## Summary

1. It is pointed out that there is need for a clarification and a better understanding of what is meant by the term "functional."

2. It is recommended that the term psychogenic be used for all cases considered emotional in origin, thereby stimulating a search for the cause of the emotional disturbance.

3. The interrelationship of psychic and somatic disturbances are discussed and emphasis laid by examples from the literature of the widespread acceptance of this interrelationship and what it means to both psychic and somatic illnesses.

4. An appeal is made for a re-unification of the various branches of medicine through the recognition of the interdependence and inseparability of psyche and soma, so that, instead of considering man as a mind and body distinct from each other, he will be considered as a psychobiological unit.

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# SECTION OF THE ANAL SPHINCTER*

**HAROLD E. HULLSIEK, M.D.**
**Saint Paul, Minnesota**

I FIND many physicians who are unfamiliar with the surgical procedure known as anotomy. Recently I looked through the indices of several works on rectal disease and found the term absent from most of them, although its misnomer, proctotomy, is occasionally mentioned. One might deduce that little attention is given to it because it is so well known that none is necessary, or because of the triviality of the procedure. I do not believe that either of these reasons is true. One of the questions most often put to me by physicians, interns, and students deals with the section of the anal sphincter.

Understanding the technique of anotomy presupposes a knowledge of the arrangement of the fibers of the sphincter muscle of the anus. These do not surround the orifice as a complete circle, but rather as a sling, gripping it laterally and anteriorly, dividing and decussating in the posterior commissure and finally joining to form the anococcygeal ligament. This anatomical distribution tends to weaken one point in the anal ring and furnishes one of the factors in the production of an anal fissure, so often seen in the posterior commissure. The formation of the sphincter at this point also permits us to divide it here with impunity, while actually severing but few of the fibers.

That there may be no confusion over the area involved I refer only to this region as the posterior commissure; that portion immediately adjacent to the coccyx. I stress this bit of terminology since proctologic illustrations are sometimes drawn with the patient shown in the lithotomy

*Read before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 29, 1941.

position, and at others with the patient prone, while an occasional writer still looks on the anal orifice as a clock dial and speaks of the relative positions as six o'clock, twelve o'clock, et cetera. The term posterior commissure is a definite one, regardless of position on the examining or operating table.

An incision may be made through the tissues at this point without interfering with sphincter competence and not only may be, but should be, done under either local, caudal, or spinal anesthesia. Inhalation anesthesia may easily lead to misinterpretation through the difficulty of attaining complete relaxation of the muscle.

The conditions offering the most nearly ideal indications for the use of this procedure are those making up the various forms of anal (not rectal) stricture. These include those involving the skin and tissues of purely ectodermal origin, the area at the level of the pectinate line, and those showing a general anal fibrosis. The chief complaint of individuals suffering from any of the above conditions is difficulty in moving the bowels, requiring the maintenance of soft or liquid stools in order to have a movement at all. Bleeding is also a frequent symptom since this usually accompanies repeated straining, the passage of a hard stool, a too-large stool, or lack of normal elasticity of the tissues involved. It is sometimes difficult to differentiate a fixed diminution in the size of the anal orifice from a tightness which is caused entirely by spasm, but the latter factor may always be eliminated by the use of a local anesthetic. The opening may be found to be so small as to barely admit the tip of the little finger, or decreased merely to the size where it grips the index finger firmly and further dilatation is impossible.

The above conditions have a number of etiologic factors, all contributing to the formation of fibrous tissue, rendering the anus inelastic, and finally fixing the size of the lumen. Now and then one sees a patient with no apparent cryptitis, without hemorrhoids, fissure, or other demonstrable lesion, and who apparently has had for years a slow inflammatory change going on in the anal canal, with the end result that the opening is far too small for the comfortable passage of a stool.

Such a case was that of an unmarried, sixty-year-old female recluse who, because of her almost continuous complaints—most of which centered on her bowel activities—was adjudged by her family to be mentally deranged. After a lengthy and rather cautious approach I was finally permitted to make a rectal examination. At the skin margin she had a band of indurated tissue surrounding the anal outlet and narrowing the opening to the size of a lead pencil. She had had prescribed for her any quantity of laxatives, suppositories, and ointments by physicians who had neglected to make a rectal examination. Posterior anotomy under caudal anesthesia, with a four-day stay in the hospital, gave her entirely normal bowel habits, and altered not only her entire outlook on life, but that of her family as well.

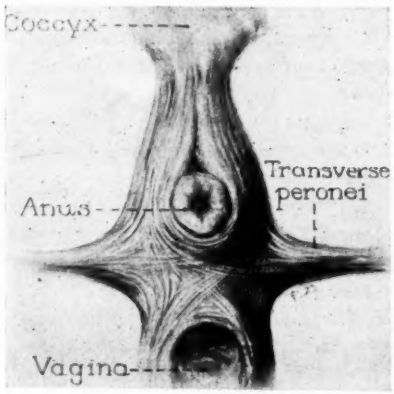


Fig. 1. Arrangement of the muscle fibers surrounding the anus (From Practical Proctology by Louis A. Buie).

A second illustrative case is that of a fifty-six-year-old farmer who told me that for twenty years he had not had a normal bowel movement, having to maintain an almost liquid stool to permit a defecation, and this always attended by more or less pain. Anotomy under local anesthesia transformed an anus which refused to admit the little finger into one of normal size. He gained weight, his general feeling of well-being was increased, and a year after his operation passes normal stools without oils or demulcents. He had no demonstrable pathologic change other than a fibrosis. A number of cases such as the above might be cited.

Since these cases are invariably found in persons at or past middle age, one concludes that the tissue changes are the result of years of a very slow process leading to a gradual thickening, loss of elasticity, and narrowing of the canal. We also know that this goes on to some extent in all

individuals, since it is a well known fact that a child is able to pass, without trauma, a larger stool than an adult. None of the above-mentioned conditions could pass unrecognized if rectal examinations were made routinely in patients with rectal symptoms, instead of the prescribing of laxatives, suppositories, and ointments with the hope that in some vague manner the symptoms will be abated.

The treatment of chronic anal fissure often entails a partial posterior anotomy since not infrequently the condition has existed for so long a time that there is a thickening of the entire posterior commissure. This latter, together with hypertrophy of the sphincter from long-continued spasm results in a narrowed anal outlet. Even though this is not the case, a posterior incision relieves spasm and the resultant pain, giving the fissure an opportunity to heal, and is, I feel, preferable to divulsion. Incision divides the tissues where the operator elects, divulsion leaves it to chance, and in average hands is far more likely to cause damage.

In the removal of numerous and large internal hemorrhoids one frequently finds it necessary to remove so much tissue that the outlet has been materially decreased in size. The time to determine whether or not this has been done, and to remedy it, is while the patient is still on the operating table, and not three weeks later. If at the completion of the operation the tip of the index finger enters the canal only snugly, it is probably too narrow for future comfort, and an incision should be made in the posterior commissure to enlarge it to the needed size. Even should this be not necessary it will do no harm. Sutures and ligatures with their resultant tension contribute largely to the discomfort following hemorrhoidectomy, hence it is my practice to make a posterior anotomy in all patients where there is any doubt as to the size of the lumen. I am certain that this procedure diminishes postoperative pain.

An incision in the posterior commissure is usually productive of but little bleeding. If there is any of consequence it is easily controlled by a ligature or two since exposure is easily attainable under local anesthesia. The incision should be made with one finger in the canal to determine the progress made in enlarging the lumen. The wound is packed with a strip of either dry or vaselined gauze which is left in for twenty-four or forty-eight hours. Doses of mineral oil or some form of demulcent should be started the same day as the operation, general diet, and hot sitz baths taken once or twice a day. From the second day on the finger is inserted every two or three days until firm healing has taken place. I have never seen an anal sphincter rendered either wholly or partially incompetent by this procedure.

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### SCIENCE IN A TROUBLED WORLD

Amidst the rumble of bombings, the distinguished physiologist and member of Parliament Dr. A. V. Hill[1] addressed the House of Commons. Dr. Hill is uneasy about certain tendencies that have developed in science in his country as they have in ours. A growing tendency for political considerations to exercise an influence on science is viewed with alarm by every scientist. "In order to preserve the integrity of science in our own country," Dr. Hill states, "it is very important that those strong independent scientific bodies should be maintained: and for the sake of international scientific relations it is desirable that in other countries also, so far as we can influence them, the domination of the state over science should be tempered by public appreciation of the part played by independent scientific agencies and institutions." The British spokesman recognizes the importance, indeed the necessity, of scientific organizations within the framework of government. Anent the hazard of government subsidized research he mentioned "the danger that he who pays the piper may call the tune, and that research may be required to be devoted primarily to objects which the politician, or the civil servant, regard for the moment as of national importance." To avoid the evils of this he calls for a powerful buffer to prevent the state from interfering with the integrity and independence of research. Dr. Hill said, in conclusion, "Blessed are they who remain innocently in their laboratories and grumble: for it is a thankless task to get things right. . . . . All we ask is that we should be considered as equals in a common task—not merely as superior technicians paid to dish up the magic which you order."

1. Hill, A. V.: Science, National and International, and the Basis of Coöperation. Science, 93:579, (June 20) 1941.

# CLINICAL-PATHOLOGICAL CONFERENCE

MINNEAPOLIS GENERAL HOSPITAL
Frank C. Andrus, Pathologist

## LUPUS ERYTHEMATOSUS

The case is that of a fifty-two-year-old Jewess who was admitted to the Minneapolis General Hospital on January 31, 1941, and who expired on March 18, 1941. Her presenting complaints were intermittent abdominal pains for the past three years, shortness of breath for the past two or three years, vomiting, and moderate weight loss over a period of the last three to four months. She had apparently been well until eighteen years ago when she became jaundiced. It was discovered at this time that she had syphilis and she received antisyphilitic therapy intermittently for many years. There had been lower thoracic and upper abdominal pains for the past three years of a rather indefinite nature. The attacks of pain were not associated with meals or with exertion. For the past three or four months there had been occasional episodes of vomiting. There had been moderate dyspnea on exertion for many years. All her symptoms had been exaggerated recently. Past history revealed that the patient had had an appendectomy and hysterectomy performed twenty-two years ago. History by symptoms was noncontributory.

Physical examination revealed a well developed and somewhat undernourished white female who was somewhat orthopneic. There were multiple areas of vitiligo on the body and over the extremities. An area of dermatitis was present on both cheeks, upper lips, and the skin. The pupils reacted sluggishly to light and accommodation. The extra-ocular movements were normal. The mouth was edentulous. The ears, nose, and throat were normal. Examination of the neck revealed no abnormalities. Examination of the chest revealed a slight area of dullness to percussion posteriorly and laterally on the right side. Percussion of the cardiac dullness suggested slight enlargement to the left. A harsh systolic murmur was heard over the entire precordium and was more marked over the aortic area. The pulse rate was 92 per minute and the rhythm was regular. The blood pressure was 160/100. Examination of the abdomen revealed no abnormalities save for slight tenderness. Physical examination was otherwise entirely negative.

*Laboratory findings.*—The urine was amber in color and cloudy and had a specific gravity of 1.019. It was acid in reaction and contained three plus albumin, no sugar, no hyaline casts, occasional granular casts, 20 to 24 erythrocytes, and 20 to 60 pus cells per high power field. The hemoglobin was 43% with an erythrocyte count of 2,600,000, a leukocyte count of 4,600, and a differential count of 96% neutrophiles and 4% lymphocytes. The serologic tests for syphilis were positive. The blood morphology studies revealed an average mean diameter of the red cells to be about 8.1 microns. The red blood cells showed slight to moderate anisocytosis and slight poikilocytosis. The white blood cells appeared somewhat toxic. X-ray examination of the chest at a distance of six feet revealed the heart to be slightly enlarged and of a left ventricular contour. There was no pulmonary pathology. An electrocardiogram revealed left axis deviation and iso-electric $T_2$. Spinal fluid examination performed at this time revealed the fluid to be colorless and clear and to contain no cells. Serologic tests for syphilis run on the spinal fluid were negative and the colloidal gold showed no curve.

At the time of admission the temperature was 100.4 degrees. Treatment consisted of bed rest, sedation, and anodynes to control pain and discomfort. Iron was administered in the form of ferrous sulphate. The patient was rather unstable emotionally. On March 5, 1941, repeated neurological examinations revealed that the pupils did not react to light and were somewhat irregular. Examination of the fundi revealed hemorrhages in both retinæ and the presence of exudate. It was noted at this time that the patient had a butterfly-shaped erythematous lesion on her face which resembled that of lupus erythematosus. She was given blood transfusions. An March 11, 1941, a Dermatological consultant made a diagnosis of lupus erythematosus. During her entire hospital course there was a daily elevation of temperature varying from normal to 100 or 101 degrees. On March 12 agglutenins for typhoid, paratyphoid, undulent fever, and tuleremia were found to be absent from the patient's blood. The patient's general condition did not improve and on frequent occasions, she was semi-comatose and irrational. On March 5, 1941, a leukocyte count of 10,900 was observed for the first time, and it remained elevated during the remainder of her hospital stay. Blood metabolites showed a progressive retention of nitrogen. On February 10, 1941, the blood urea nitrogen was 9.1 mg. per cent and the creatinine was 1.5 mg. per cent. On two subsequent occasions the blood urea nitrogen was 35.4 and 40.6 mg. per cent respectively, finally rising to 50.4 mg. per cent on March 14, 1941. Several blood cultures were negative. The patient became generally weaker and towards the end of her hospital course, she was almost constantly irra-

tional. Her temperature continued to remain elevated, ranging between 99 and 103 degrees. She expired on March 18, 1941.

*Clinical Diagnosis.*—Lupus erythematosus and nephritis.

*Anatomic Findings* (Dr. Frank C. Andrus).—The body was that of a fairly well developed and moderately emaciated white woman. There was a butterfly-shaped area of erythema involving the bridge of the nose and both zygomatic processes. There was also involvement of the skin of the upper and lower lips of a similar process to that found on the cheek. There was another smaller area of erythema in the region of the suprasternal notch. A decubital ulcer measuring 3 cm. in diameter was found over the sacrum. Vitiligo and pigmented areas were seen over the dorsum of the hands and distal one-half of the dorsum of both forearms. There was no edema or cyanosis. A moderately deep jaundice was seen of the skin and scleræ.

The peritoneal cavity was normal. Both pleural cavities were completely obliterated by adhesions as was the pericardial sac. The heart, including part of the pericardium, was not increased in weight. The heart in situ was 13 cm. in its greatest transverse diameter. The myocardium appeared normal. No significant hypertrophy was noted. The aortic, tricuspid, mitral, and pulmonary rings were not increased in circumference. There was no gross valvular deformity. There was moderately severe sclerosis of the anterior descending branch of the left coronary artery and minimal sclerosis of the right coronary artery as well as of the circumflex branch. The arch of the aorta was slightly dilated and its intimal surface presented the characteristic appearance of syphilitic aortitis. The aortic valve was not involved. Both lungs were entirely normal. The spleen was slightly increased in weight. Its capsule was smooth; however, no gross abnormality was seen. The liver was enlarged and showed fatty metamorphosis. The gall bladder and bile ducts were negative. The gastro-intestinal tract, pancreas, and adrenal glands appeared normal.

The kidneys were of normal size. The capsules of both kidneys stripped with difficulty revealing finely and coarsely granular pitted surfaces. There were four or five small petechiæ measuring approximately 2 mm. each in diameter on the mucosal surface scattered about the mucosa of the left renal pelvis. There were no calculi in the urinary tract. The ureters were not dilated and the urinary bladder appeared normal.

There was no lymphadenopathy save for a few small mediastinal lymph nodes containing carbon pigment. The remainder of the examination revealed no abnormalities.

Microscopic examination of the tissues in this disease reveals no typical lesions except in the skin and in the kidneys when the latter are involved. The kidneys present a peculiar and typical lesion, that of a patchy hyaline thickening of some of the tufts of the glomerular capillaries. I have never seen this change in other diseases. This accounts for the albuminuria, etc. The glomeruli are not obstructed enough to cause severe renal insufficiency or marked hypertension. Notice that at one time, the blood urea nitrogen was decreased. This was due to the extreme fatty degeneration of the liver—a result probably of chronic sepsis. There was later oliguria and azotemia developed. The heart valves, myocardium, lungs, and other organs revealed no histologic abnormalities. As Dr. Buehler will point out, the story related above is highly characteristic of disseminated lupus erythematosus. Of particular importance are the cutaneous lesions, the prolonged sepsis, negative blood cultures, the anemia, leukopenia, and urinary findings.

*Anatomic Diagnoses.*—Subacute, disseminated lupus erythematosus, fatty degeneration of the liver, syphilis of the aorta, adhesive pericarditis, coronary sclerosis, and hypertension.

## Discussion

Dr. Martin S. Buehler: Since 1933, when Libman and Sacks first described an typical endocarditis associated with a lupus erythematous-like lesion, it has become increasingly apparent that, while not all cases show an endocarditis, there is a definite clinical entity associated with systemic or disseminated lupus erythematosus. Baehr and Klemperer in 1935 and Keil in 1940 have given excellent reviews of this condition. We wish here to summarize the important clinical findings and to present a case which we believe fits into this entity.

The clinical course is characterized by prolonged and irregular fever and tendency to spontaneous remissions lasting from a few days to several years, by involvement of the serous, synovial, and often mucous membranes, by depression of the bone marrow, by signs of renal damage, and by the cutaneous lesions. The etiology is unknown but the work of Welch suggests a bacterial origin, possibly a streptococcus, in the disseminated form. Tuberculosis is not believed to play any part in the disease. The prognosis is very poor although some of the patients may live for five years after the onset of symptoms. Death usually occurs from bronchopneumonia, renal insufficiency, or toxemia. The disease shows a striking predeliction for females. Twenty-two of the twenty-three cases of Baehr and Klemperer were in women, all of them between the ages of puberty and menopause. The most common disseminating factor is exposure to sunlight, to ultra violet or roentgen rays. In fact, many of the patients present a picture similar to severe sunburn and often give a history of unusual sensitivity to sunlight, and may even date the onset of their symptoms from such an exposure. The disease runs a septic course with a prolonged, irregular, febrile reaction. The temperature, however, may not become elevated for some time after the systemic symptoms occur. The patient may even be unaware of the presence of fever.

The typical cutaneous lesions consisting of an erythematous area arranged in a butterfly distribution over the face and cheeks is usually present and easily recognized. This was present in twenty-two of the twenty-three cases of Baehr and Klemperer. The typical lesion may not appear for some time after the findings of the systemic disease appear. It may be replaced by atypical areas of erythema in various parts of the body and so render the diagnosis more difficult, or the cutaneous lesions may appear several years before the systemic symptoms. The presence of purpuric lesions and telangiectatic areas within the butterfly pattern have also been noted. Polyarthralgia or arthritis, usually without definite evidence of intra-articular destruction,

are usually present. They might, however, precede the cutaneous lesions and in such a case probably could not be distinguished from rheumatic fever, infectious arthritis, or acute rheumatoid arthritis until the appearance of typical skin lesions. The joint symptoms tend to undergo spontaneous remissions with complete recovery in a few days or they may leave residual stiffness or aching after the acute phase.

The kidneys are affected in such a high percentage of cases that this feature must be considered as a definite part of the syndrome. Albuminuria is slight at first but later is two or three plus. A few white blood cells, hyaline and granular casts, microscopic hematuria with occasionally gross hematuria, are the usual findings and are fairly consistent. Azotemia is usually present to some degree, usually moderate because of the patchy distribution of the glomerular lesions. The azotemia may undergo remissions and terminally may become quite marked. Since isosthenuria is usually present, the differential diagnosis from glomerulonephritis may be difficult. The blood pressure is usually normal or only slightly elevated.

The myocardium is usually spared and heart failure is uncommon. The mural or valvular endocardium is involved in almost half of the cases. Patchy or obliterating pericarditis is not an infrequent finding, especially in the presence of verrucous endocarditis, and a friction rub may be heard. Tachycardia is a common finding and the heart is usually very slightly, if at all, enlarged.

The fundi often reveal soft, fluffy exudates, considered by some authors to be collections of edema fluid, and perivascular hemorrhages are often present. Peripapillary edema is usually seen and the eye-ground changes usually undergo spontaneous remissions and may completely disappear. Visual disturbances are uncommon. The serous membranes are commonly involved with pleuritis, pleural adhesions, and pleural effusion. Ascites is rather rarely encountered. Areas of erythema and petechiæ have been noted on the oral mucous membranes and these soon erode and become ulcerative. They tend to heal as the condition improves. Moderate generalized lymphadenopathy is common. The spleen is occasionally enlarged to a moderate degree.

*Laboratory Findings.*—The urine has already been described. Blood cultures are almost invariably sterile and remain so until terminally when various organisms may invade the blood stream through such portals of entry as trophic ulcers. There is evidence of bone marrow depression with a secondary anemia and thrombopenia with a tendency to purpura and characteristically, a leukopenia with a normal differential count. A few abnormal cells of the myelocytic series may be present in the smear. Terminally, a leukocytosis may appear but this is usually only a moderate elevation.

Pathologically the tissues show the following:

1. The heart in almost half of the cases shows atypical verrucous vegetation both on the valves and mural endocardium. There is a consistent absence of Aschoff bodies and no bacteria can be found on smear or culture. An acute bacterial endocarditis may be present.

2. In the kidneys, Baehr and Klemperer believe the "wire loop" glomerular lesions are specific. They found them in eighteen of their twenty-three cases. These consist of a patchy thickening of the capillary basement membranes in the glomerulus, involving only some of the tufts. There is no typical glomerular nephritis.

3. There is no constant type of vascular lesion but some have described vascular lesions in various organs other than the kidneys.

4. The liver may show enlargement, areas of necrosis, or fatty changes.

DR. L. H. WINER: The term "lupus erythematosus" is a very poor one to apply to this condition for when we say "lupus" we usually think of something tuberculous. In the chronic type there is at first no disturbance to the patient's general health. One has the impression of a sunburn when the patient is first seen. However, the sunburn persists and strangely, many give the history of having been fishing or otherwise exposed to the sun. It is important to examine the mucous membranes for they are not exposed to the sun and if they are involved, you will know that you are not dealing with a simple sunburn. Those edematous, reddened areas are not only seen in the mouth. I remember one patient who had lesions only on the labia and vagina. Sometimes the patient with subacute lupus erythematosus will pass into an acute form just before death. The etiology of this disease is entirely unknown. It is not tuberculous and animal inoculations are all negative. We have no specific treatment. It is one of the fatal skin conditions. We put the patients to bed, keep the room dark and the patient quiet and comfortable; and that seems to be as much as anyone can do.

## APPEAL FOR MEDICAL FUNDS IN CHINA

The University Hospital of Nanking, which is run by the University of Nanking and is one of the thirteen colleges in China supported by the Associated Boards of Christian Colleges in China, during the last six months handled an average of 9,702 patients in its wards and clinic, and in addition carried out 185 major operations. The total operating expense for one month was $200 in American money. The doors of the hospital have served rich and poor alike during bombing, siege and Japanese occupation. Training of interns and nurses has continued in spite of difficulties.

The Association Boards and United China Relief have recently issued an appeal for funds to maintain and develop the medical work of the Christian Colleges in China.

Contributions may be made to Artemus L. Gates, Treasurer, United China Relief, 1790 Broadway, New York, N. Y.

# HOMEOPATHIC AND ECLECTIC MEDICINE IN MINNESOTA*

By James Eckman

Rochester, Minnesota

*(Continued from August issue)*

## Homeopathic Literature

*Minnesota Medical Mirror.*—This publication was eclectic in inclination, but it published papers and reports representing all schools of medicine. It was edited and owned by Dr. Nereus M. Cook (1852-1927), who in 1881 was living in Cambridge City, Minnesota. It cost $1.00 a year. Single copies cost 10 cents each. First issue of the *Mirror* was dated December, 1881. With the issue for October, 1884, the journal was published in Minneapolis, and the last issue was the one for March, 1885. Four volumes in all were published. After publication of the issue for October, 1883, at Cambridge, the *Mirror* was suspended. It next appeared in October, 1884, and was issued in Minneapolis by the Medical Mirror Publishing Company. Two associate editors were appointed by Dr. Cook: Dr. E. L. Stevens and Dr. Charles Sidney Stoddard (1846-1928), both of Minneapolis. Dr. Stoddard had been a classmate of Dr. Cook at the Bennett College of Eclectic Medicine and Surgery of Chicago in the class of 1874. The *Minnesota Medical Mirror* consistently urged the establishment of harmony among all schools of medicine: it spoke well of the old *Northwestern Lancet* of Saint Paul, reprinted papers from other "regular" medical journals, and published the notices and occasional papers of the Minnesota State Eclectic Medical Society. In October, 1882, an interesting paragraph was printed in the *Mirror*:[59]

> JOURNAL OF AM. MED. ASSOCIATION.—If 2,000 subscriptions are promised the publication of this journal will be undertaken. It will be a good idea. Members of the Association who pay their annual dues will receive it free. To others the price will be $5.00. Address Prof. N. S. Davis, Chicago.

Dr. Cook apparently thought he had instituted the second medical journal to be published in Minnesota. He credited the *Northwestern Lancet,* begun by Dr. Jay Owens (1852-1890) in 1881, as being the first medical journal in Minnesota; he considered his own to be the second.[60] This was an error. The *Minnesota Homœopath,* started in 1858 or 1859, was the first, and the *Northwestern Medical and Surgical Journal* of Dr. Alexander J. Stone (1845-1910), founded in Saint Paul in 1870, was the second medical journal in Minnesota.[61]

*Northwestern Medical Journal.*—In referring to this particular journal the author believes that he is on insecure ground, for the *Northwestern Medical Journal* was but one title of a single publication which had, during its existence, no less than seven names. The *Northwestern Medical Journal* apparently was

started in Newark, New Jersey, in August, 1874, as the *New Jersey Eclectic Medical and Surgical Journal.* It retained this title through October, 1876. In June, 1877, the publication was resuscitated (by the same editor) as the *New York Eclectic Medical and Surgical Journal.* The last issue of the journal under the aforementioned name was the one for February, 1880. In March, 1880, it became the *New York Medical and Surgical Journal* of New York City, and it retained this title through the issue for May, 1881. In June, 1881, it was styled the *New York and Chicago Medical and Surgical Journal,* and it remained so through the issue for October, 1881. Armstrong[62] wrote that the *Minnesota Medical and Surgical Journal* was printed in Minneapolis from the issue of August, 1886, through March, 1887. In 1889 this publication became the *Minnesota Medical Journal,* and Armstrong[62] wrote that only one issue bearing this title was published. From 1889 to 1895 the journal was called the *Northwestern Medical Journal,* and the last issue of it supposedly was the one for January, 1895. More research will have to be done before the true dates of issuance and correct titles of the several magazines which culminated in the *Northwestern Medical Journal* can be established.

The editor and publisher of the journals listed in this particular section was Dr. Edward N. Fishblatt (?-1898). He was not a physician much esteemed by his fellows, it would appear, for on August 1, 1887, he was disbarred from the practice of medicine in the Territory of Dakota "for gross unprofessional conduct, advertising and quack methods."[63] He had been licensed in the territory on September 24, 1885, and at that time he said he had been graduated from the Eclectic Medical College of the City of New York on February 8, 1868. His residence at the time of registration in the Territory of Dakota was Janesville, Rock County, Wisconsin.[63] On page 38 of the *Minnesota Medical Mirror* for January, 1883, as a testimonial for Richardson and Company, Wholesale Druggists, of St. Louis, Missouri, the following letter was reproduced:

> CEDAR RAPIDS, IA., Dec. 13, 1882.—I have been using "Celerina" in my practice very extensively for two years, *and in sexual debility and nervous diseases it produces excellent effects.* Think I have used at least one thousand bottles.
>
> E. N. FISHBLATT, M.D.

Fishblatt apparently had ceased to publish the *New York and Chicago Medical and Surgical Journal* in October, 1881; if he was in Iowa in December of 1882, as the aforementioned letter would indicate, it is probable that he was not issuing a medical journal of any kind at that time.

Dr. Fishblatt's name appears in the Minneapolis city directory in 1889, and in that year he had an office at his home at 910 Sixth Avenue South. In 1890 in the Minneapolis directory he listed himself as "Ed. Med. Journal," and he was still at the same address. On March 26, 1894, his wife, Mary Fishblatt, died of meningitis at the residence at 910 Sixth Avenue South, and Dr. Fishblatt thereupon moved to 251 Bank of Minneapolis Building at Third Street and Nicollet Avenue. In 1896 he had an office and residence at 830 Fourth Avenue South, and in the 1898 city directory he is listed as "deceased." Nothing more at present is known of his life and career, excepting that in 1894 he bought a lot (number 96 in section 12) in Lakewood Cemetery in Minneapolis for interment of the body of his wife, Mary Fishblatt.[64] Mr. W. K. Larsen,[64] of the Lakewood Cemetery Association of Minneapolis, has reported that the body of Dr. Fishblatt is not interred in Lakewood Cemetery.

### The Minnesota State Eclectic Medical Society

Armstrong[3,48] has shown that two years after the foundation of the Minnesota State Homœopathic Institute in 1867, the Minnesota State Eclectic Medical Society was incorporated, the date being May 26. Eli Martin Morehouse (1835-1891) of Owatonna was elected president of this society, S. M. Morrison was chosen vice president, N. L. Culver was made recording secretary; L. F. Case was elected corresponding secretary, and Charles Lee was treasurer. On November 14, 1869, the Southern Minnesota Eclectic Medical Society was incorporated, and Armstrong[48] said that it was a larger society than the state eclectic body. The Minnesota State Eclectic Medical Society was still in existence in December, 1881, when Dr. Nereus M. Cook (1852-1927) began to publish his eclectic *Minnesota Medical Mirror* at Cambridge City, Minnesota. On May 30, 1883, at Owatonna, the state eclectic society held its fifteenth annual session in the opera house of that city, and it would appear that Morehouse was again elected president of the society.[65] A resolution was adopted which urged the Board of Regents of the University of Minnesota to "give the eclectic or reform system of medicine a representation in the faculty of the University," and Dr. Theodore L. Hatch (1848-1913) of Owatonna, Dr. R. F. Lynch and Dr. T. A. Caldwell were elected delegates to the convention of the National Eclectic Medical Association which met at Topeka, Kansas, on June 20, 21 and 22 of 1883. When the Minneapolis College of Physicians and Surgeons was founded in 1883 Cook[66] hailed the news in the *Minnesota Medical Mirror* with "Another medical educator. Hurrah for this great state! Next in order is an *eclectic* medical college." Dr. E. L. Stevens[67] of Minneapolis observed in 1884:

> There is no one thing that would do as much to awaken an interest in this matter [eclecticism], as an Eclectic college in the Northwest. At present, if a young man wishes to secure a medical education, and is Eclectic in his views, he must either go to Chicago, or attend the Allopathic college in this city. Nebraska Eclectics have demonstrated their enterprise by securing a school in connection with the State University.* Perhaps we cannot do the same in this state, but we might inaugurate the work in time to commence the first term next fall.

So far as the author is aware, eclectic medicine and surgery were never taught at the University of Minnesota. As for the Minnesota State Eclectic Medical Society, the year of its dissolution is unknown. It seems to have been a fairly well-maintained organization, however, since it elected and sent delegates to the National Eclectic Medical Association** at least once.

### Certain Homeopathic and Eclectic Pioneers†

On the wall of the west grand stairway of the House of Representatives in the Capitol at Washington, D. C., is a fresco painting by Emanuel Leutze (1816-1868) called "Westward the Course of Empire Takes Its Way," after a line from the ode to America by the great English metaphysician and Anglican

*This was the University of Nebraska College of Medicine, Eclectic Department, at Lincoln. The department was organized in 1883 and became extinct in 1885.

**There is evidence that this association is still in existence. On May 7, 1941, Dr. William D. Cutter, secretary of the Council on Medical Education and Hospitals of the American Medical Association, advised the writer that Dr. Jesse Kersey Bailey (1888-) is president of the National Eclectic Medical Association.

†Some of the biographic material to follow appears in print for the first time. Dates of birth and death are those which have been published in the *Journal of the American Medical Association* when that journal was able to obtain data pertaining to the men concerned. In other cases, dates of birth have been obtained from the Minnesota State Board of Medical Examiners, clerks of district courts, known relatives of deceased physicians, histories of cities or counties of Minnesota, the United States War Department, the United States Veterans' Administration, newspapers, and in instances in which distance was not a prohibitive factor, from the results of personal visits by the author to certain towns and cemeteries in the vicinity of Rochester. The assistance of Dr. John M. Armstrong of Saint Paul has been invaluable.

clergyman, George Berkeley (1685-1753), who, it is interesting to notice, conceived the idea that tar water was a specific for smallpox, pulmonary tuberculosis, pleurisy, erysipelas, asthma and other conditions, while he was an evangelist in Rhode Island from 1729 to 1732.[68] The painting in question has been called an artistic failure, and has been adversely criticized with great vigor; but it has been said[69] that President Lincoln liked it well enough to visit the Capitol at odd moments to see how Leutze's work was progressing. In respect to the state of Minnesota this allegorical painting, good or bad, typifies in striking manner the exodus of settlers from New England and the Atlantic Seaboard and their interminably slow journeys to the tablelands beyond the Mississippi River. The influence of New England emigrant-physicians on the practice of medicine in Minnesota is considerable. It is true that other influences were operative. In Saint Paul the early practitioners were French, German and Yankee; in some regions, and especially in the town of New Ulm, nearly all the early physicians were Germans. In still other sectors, as in the settlements of Silver Lake and Montgomery, Bohemian practitioners were the first to predominate. The South is scarcely represented in the early medicine of Minnesota, and the Great West is negligible as an influence. The work of surgeons attached to the United States Army in the pioneer territory cannot be passed by lightly, nor can the chiefly unsung labors of physicians who entered the state as members of various expeditions by early explorers be dismissed. It may be pointed out, also, that as late as 1881 and 1882, during the great epidemic of smallpox which swept over Minnesota in those years, enlightened priests in many sections of the state courageously offered their services to the Minnesota State Board of Health and acted as vaccinators in regions in which the settlers otherwise would have had no medical care at all. In the main, however, the weighty influence of New England emigrant-physicians cannot be denied. That influence apparently was wielded by early homeopathic and eclectic physicians as well as by the so-called regular practitioners, as will be shown in the ensuing pages.

One of the hardiest progenitors of homeopathy in Minnesota was, oddly enough, neither a physician nor a homeopath. He was a dentist. **Abner Laycock Bausman** was born in Ebensburg, Pennsylvania, in 1834. He was educated in the manner of most denizens of the rural districts in the early days of the last century, and studied dentistry under the preceptorship of a dental surgeon in Pittsburgh. There is no record that Bausman ever attended a dental school or a medical college. In 1856 he came west to the Territory of Minnesota, settling near Mankato. A year later he came to the struggling frontier village of Minneapolis, which was still of such uncertain destiny that the town of St. Anthony (now East Minneapolis) on the east bank of the Mississippi River was separated corporately from it.

In Minneapolis the twenty-three year old dental surgeon opened an office on what is now Second Avenue South, between Washington Avenue and Second Street. "A. L. Bausman, dentist," wrote the younger Leonard,[70] "ministered to nearly all the early citizens of prominence, and was always an important political factor." As the burgeoning pioneer community expanded with the opening of the great Northwest to the railroads, Bausman became an influential citizen. He was a voluble Republican, resident in a state which from the election of 1859 to the election of 1898 chose none but Republicans as chief executives. He was a power in early Minneapolis politics, and there is reason to believe that he was an important influence in state political circles.

Bausman helped to found the Minneapolis Athenaeum, now the Minneapolis

Public Library. He was an enthusiastic advocate of the homeopathic system, and was well known throughout the state for his efforts in behalf of *similia similibus curantur*. He moved to an office at 242 Nicollet Avenue in 1870, an action that brought him into intimate association with most of the homeopathic physicians of the day, who leased headquarters in that section of downtown Minneapolis. Hamilton[43] has recorded the fact that in 1882 and 1883 Bausman was secretary of a "Homeopathic Hospital" of Minneapolis; in 1886 he was chairman of a committee of five members which drew up articles of incorporation for the Minnesota Homœopathic Medical College and provided for the issuance of the *Minnesota Medical Monthly*.[50] On May 21, 1886, he was chosen a trustee of the medical college. He was also elected vice president of the Minneapolis Homœopathic Hospital, then situated at 2446 Fourth Avenue South, and in 1888 was awarded the honorary degree of Doctor of Medicine by the Minnesota Homœopathic Medical College.

Aldrich[36] wrote that after physicians of the dispensary staff of the Minneapolis Homœopathic Medical College organized the Minneapolis Clinical Society early in the eighties, interest in the society lagged, and the organization slipped into desuetude. Dr. Bausman revived the group, and meetings of it were held in his dental office at 242 Nicollet Avenue. It soon became known as "Dr. Bausman's Clinical Society," according to Aldrich,[36] and homeopaths from all parts of the state attended its sessions.

Dr. Bausman was in every sense a pioneer. He was one who helped to usher in homeopathy in Minnesota, and he lived long enough to witness the decline and virtual disappearance of the system of medicine which he had for years served so arduously. He died at his home at 2540 Pleasant Avenue in Minneapolis on August 29, 1911.[71]

In East Minneapolis (St. Anthony) **Dr. William A. Penniman** (1802-1872), who was graduated from the "regular" Jefferson Medical College of Philadelphia in 1827, began to practice in 1856.[6] Aldrich[36] said that during the devastating epidemic of smallpox which afflicted Minneapolis and St. Anthony in 1857 Dr. Penniman lost not a single patient. Born in Albany, New York, on October 18, 1802, Penniman had been trained as a so-called allopathic physician, but had turned to homeopathy while he was practicing in Pittsburgh in about 1846. He was the first president of the Minnesota State Homœopathic Institute, and at his death in Elizabeth, Pennsylvania, on March 10, 1872, bequeathed a considerable sum of money to his homeopathic colleagues in Minnesota, as has been shown.

In Minneapolis proper the first homeopathic physician was said by Aldrich[36] to have been **Dr. Philo L. Hatch** (1823-1904), who came to Minnesota from Dubuque, Iowa, in 1858. He had been graduated in 1857 from the old Homœopathic Hospital and College of Cleveland. He was one of the sixteen founders of the Minnesota State Homœopathic Institute, and was elected president of that organization in 1875. In 1875, also, he was president of the Hahnemann Medical Society of Hennepin County, and corresponding secretary of the Minnesota Academy of Natural Sciences. In 1880, he was elected president of the academy. He served as first dean and professor of obstetrics of the Minnesota Homœopathic Medical College, opened on October 4, 1886. He was also vice president of the board of trustees of that institution. Aldrich[36] said that Dr. Hatch was the first ornithologist of the University of Minnesota. In 1887, Dr. Hatch was forced to leave Minnesota because of the precarious health of his wife, and he

went to California. In 1891, he wrote *Notes on the Birds of Minnesota,** a 481-page work. Dr. Hatch died at Santa Barbara, California, on May 21, 1904.[72]

**William Huntington Leonard,** easily the outstanding figure in the history of homeopathy in Minnesota, was born on December 2, 1825, in Mansfield, Tolland County, Connecticut. His father, Dexter M. Leonard, was the son of a well-known physician of Ashford, Connecticut. Aldrich[36] wrote that the first Leonards to come to America were James and Henry Leonard, who settled in Taunton, Massachusetts, in 1652, and there erected the first forge in America. Young Leonard worked on his father's farm, achieved his education at a select school, and then taught school for six years. He finally decided to become a physician, and began to study medicine under the preceptorship of Dr. Orrin Witter, of Chaplin, Connecticut. He spent the winters of 1850 and 1851 at the University of New York, and was graduated as a "regular" physician from the Medical Institution of Yale College in 1853. For the next two years he practiced in Orangeville, in Wyoming County, New York.

Dr. Leonard came to Minneapolis in 1855, where on June 20 he helped **Dr. A. E. Ames** (1814-1874), found the old Union Medical Society of Minneapolis and St. Anthony. He proclaimed himself a convert to the homeopathic system of medicine in 1859 or 1860, but was still a member of the Union Medical Society in 1862.

The younger Leonard[70] revealed that his father had been a partner of **Dr. Charles L. Anderson,** who, as both Hamilton[73] and Flanagan[74] have pointed out, was the physician with whom Henry David Thoreau (1817-1862) was associated when the author of *Walden* came to Minnesota in the last years of his life suffering from pulmonary tuberculosis. Dr. W. H. Leonard and Dr. Anderson were partners in the period in which Leonard was a "regular" physician; which is to say, before 1859 or 1860. Dr. Anderson was recording secretary of the old Minnesota Medical Society which was organized in Saint Paul on Saturday, July 23, 1853,[75] and was said to have left Minneapolis for Carson City, Nevada, on May 13, 1862. He published "Agriculture West of Minneapolis" in the old *Minnesota Democrat* for the issue of October 25, 1856, and appears to have been a genuinely learned man.[73] As Dr. J. M. Armstrong once remarked to the author, a thorough study of Dr. Anderson's life and career no doubt would be productive of considerable interest.

Another piece of information presented by the young Leonard was the fact that "My father, Dr. William H. Leonard, and Mr. Schuyler Johnson, Mrs. Andrew Rinker's father, lived in the south side of Second street near Hennepin avenue, in buildings which are now [1915] a hide store . . . "[70]

In 1860, Dr. Leonard became the partner of Thomas Gardiner, in a drug business.[31] During the War of the Rebellion he was assistant surgeon to the Fifth Minnesota Regiment, and was the messmate of Archbishop John Ireland, who at that time was a young priest serving as chaplain to the regiment. Dr. Leonard was discharged from the United States Army at Fort Snelling in 1865, and according to his son,[70] brought to Minneapolis a great white charger called "Charlie," which he had ridden throughout the siege of Vicksburg. He also had with him another horse and a queer old Negress called "Aunt Hester

*This book was published in 1892 as volume 1 of the Zoölogical Series of the Geological and Natural History Survey of Minnesota, and is still consulted by ornithologists. It may be found in Henry F. Nachtrieb's *First Report of the State Zoölogist, Accompanied with Notes on the Birds of Minnesota, by Dr. P. L. Hatch,* Minneapolis, Harrison & Smith, Printers, 1892. It occupies almost the whole of Nachtrieb's report.

Patterson," whose strange dialect and energetic mannerisms caused natives in East Minneapolis, where she lived, much astonishment and some chagrin.[70]

In 1867, Leonard lived at Fifth and Helen Streets in Minneapolis, and his office was at No. 2 Center Block, on Hennepin Avenue between Washington Avenue and Second Street. In this building he operated "W. H. Leonard & Company, Druggists." By the year 1874 he had moved both his office and his place of residence to a house at 424 Second Avenue South and he conducted his practice at this address until 1887, when he opened an office at 409 Nicollet Avenue.

"He was the first health officer who introduced the vital statistics of the city [Minneapolis]; also the first commissioner of the State Insane Examining Board," Aldrich[36] wrote of Leonard in 1893. Hamilton[76] wrote that Leonard became health officer of Minneapolis in 1869 and held the post until 1872. In 1875, Governor Cushman K. Davis (1838-1900) appointed Dr. Leonard to the Minnesota State Board of Health, a position he held for almost a quarter of a century.

He was much interested in the Minnesota Academy of Natural Sciences, which he helped to found in January of 1873, and in 1875 he gave to the academy his collection of bones and stone implements which he had obtained from Indian mounds at Lake Minnetonka.

Evidence exists which would suggest that Dr. Leonard in 1867 almost single-handedly founded the Minnesota State Homœopathic Institute. In the *Transactions* of the state body is the statement that on February 14, 1867, the recording secretary of the convention which organized the institute was directed to pay to Leonard the "sum of $4 (four dollars) expended by him for printing circulars, and postage."[77] Such a statement would indicate that if Leonard did not himself conceive the idea of establishment of the state society, he at least was responsible for calling the homeopathic practitioners of the state together, and for supervising printing and mailing of the call which was sent out to them.

The Hamiltons[33] said that the founding meeting of the Hahnemann Medical Society of Hennepin County was held in Dr. Leonard's office on September 16, 1872, and that Dr. Leonard was elected first president of the society. In 1887 and 1888 he was again president of this society, and on December 3, 1887, Dr. John A. Steele, at a meeting of the organization, presented to Dr. Leonard a gold-headed cane in behalf of the homeopathic practitioners of the city.[78]

Dr. Leonard practiced medicine with his son, **William Edwin Leonard** (1855-1935), after the younger man had been graduated from the Hahnemann Medical College and Hospital of Philadelphia (1879), and had returned to Minneapolis after a year's internship at Ward's Island Homœopathic Hospital in New York City. The father was licensed to practice medicine in Minnesota on October 15, 1883, and the son obtained his license in November of the same year.[79]

In 1903, the homeopathic practitioners of the city of Minneapolis tendered a banquet to Dr. W. H. Leonard on the occasion of the fiftieth anniversary of his entrance into the practice of medicine in 1853. Elbert Hubbard (1859-1915) and Mark Twain (1835-1910) sent congratulatory telegrams to the aged practitioner,[80] and in reporting the celebration the "regular" *Northwestern Lancet* of Minneapolis paid tribute to the "silent influence for good of these fifty years" which he had exercised. The journal added, "It is the wish of the *Lancet* that Dr. Leonard may live to celebrate the 75th anniversary of his practice."[80]

The wish of the *Northwestern Lancet* was never realized. Dr. W. H. Leonard died in Minneapolis on April 9, 1907, fifty-two years after he had first set foot on the muddy streets of the then sprawling frontier hamlet. "Dr. Leonard was an exceedingly popular physician," observed the *Journal of the Minnesota State Medical Association and the Northwestern Lancet,* "successful, skillful, genial, and conscientious in whatever work or study he undertook. When he became a homeopath he carried out the Hahnemann idea faithfully and persistently. He was true to his principles and sincere in his beliefs."[81]

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*References 1-18 appear in the June issue, page 479; 19-37 in the July issue, page 572; 38-58 in the August issue, page 674.

*(To be continued in the October issue.)*

# President's Letter

## ARE WE VULNERABLE?

AMERICA owes its prominence among the nations of the world not to the mind primarily of one man but to the combination of the thoughts of many strong men working for the good of the whole. The Constitution of our United States was not the work of a day or two or a week but the result of many days and weeks of sincere and conscientious deliberation by many men. Out of this came a remarkable document which we all enjoy because of its fine phraseology expressing the ideas of master minds who thought up and put together the document with a clear discernment of future needs.

Today we find prepayment medical care plans springing up all over the country primarily fostered by lay people for mercenary reasons who have little or no thought specifically for the good of the people and certainly are not concerned with the present position or future well-being of the medical profession.

Someone has said that if you wish to sell questionable securities or other "get-rich-quick" schemes, be sure and see the professional men of the community first; and one sometimes wonders whether this is not justified when we see men of our profession in the best of standing condoning prepayment medical care schemes without exercising the judgment which comes from consulting with those who are in a position to pass on their worth or merit.

It has taken years to build up our present patient-physician relationship. No one man or any number of men should consider themselves so strong that they can break it down. If we in this state go into schemes such as have been proposed, with all their complications, we may find ourselves slain by a boomerang of our own throwing when people who purchase so-called protection find that it is at an exorbitant price and that the service rendered is of mediocre quality.

Hospital service organizations are successful because their control has remained within the hospitals themselves, service being considered first, self-gain relegated to second place.

Prepayment medical care will be likewise successful if its control remains within the profession.

It is paramount that changes of all kinds must of necessity come from within ourselves, not be forced upon us from without by those who do not understand our problems. In Minnesota all plans must be applicable, state wide, and not reserved for the few.

Sometime in the future after study, study, and more study, a plan will be evolved by minds within our association which will embody all the good features which are desirable for our people and ourselves and eliminate those things glaringly wrong in many present schemes now being foistered on an unsuspecting public and ourselves.

B. J. BRANTON, M.D., *President*
Minnesota State Medical Association

# EDITORIAL


## MINNESOTA MEDICINE

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BUSINESS MANAGER
J. R. BRUCE

Volume 24 SEPTEMBER, 1941 Number 9


## THE EPIDEMIC OF ENCEPHALITIS

THE epidemic of encephalitis which is afflicting our state and North Dakota and to a lesser degree South Dakota, Iowa and even Manitoba is of serious concern to the profession. The first article in this issue, by C. M. Eklund of the Division of Preventable Diseases of the Minnesota State Board of Health, should prove of interest to our readers.

The 600 odd cases of encephalitis reported to date include cases suspected by the reporting physicians; the profession being encephalitis-minded it is safe to assume that as many as 50 or 60 per cent of those reported are not encephalitis. On the other hand many cases have doubtless been overlooked because of the inherent difficulty in the diagnosis of this disease. One fact is certain—that an epidemic exists.

Physicians have been asked to send blood specimens to the State Laboratory for neutralization tests. This they have been doing, which has taxed the ability of the laboratory beyond its powers and reports have, therefore, been delayed and will continue to be delayed, although they eventually will be forthcoming. When one considers that it requires twelve or sixteen mice to perform one test, the total volume of work required of the laboratory is indicated. The accuracy of the neutralization test is limited by the fact that a certain percentage of the adult population, perhaps as high as 25 per cent in the case of the St. Louis variety, show a positive test in the absence of any clinical symptoms. A negative test within the first few days of the onset of the symptoms, followed by a positive test a week or more later, would thus be more reliable. The neutralization test is therefore only an adjunct to the clinical diagnosis of the disease.

Knowledge of the epidemiology of encephalitis is woefully lacking. The present type of encephalitis is a distinctly different disease from the post-influenzal encephalitis. The post-influenzal type seemed to attack young adults for the most part, was characterized by ophthalmoplegia, and resulted often in prolonged cerebral sequellæ. The disease appeared in spring and winter. In 1933, and again in 1937, St. Louis was afflicted by a type of encephalitis different from the post-influenzal and also different in some respects from the present encephalitis disease, which is due to a virus identical with that causing the disease in horses and therefore known as the equine variety. This is further divided into the eastern and western varieties. The western variety is the less severe and is fortunately the type of disease we have with us. It affects all ages, is not characterized by ophthalmoplegia, and sequellæ are not outstanding. The mortality is around 10 per cent. It is prevalent in the summer and early fall and disappears with the coming of frost.

Although known as the equine variety of encephalitis the relation between human and equine infection is not at all clear. Although it is known

that a mosquito feeding on a virus-containing brain or an animal sick with the disease after a seven-day period of incubation can infect another animal by its bite and that a mosquito might carry the infection after biting a horse during the first day or two of its sickness, the relationship of horse, mosquito and man infection is not so simple. This is shown by the fact that in 1937 there were about 45,000 horses sick with equine encephalitis in the state and again in 1938 some 28,000, and yet we had no human epidemic. This year only some 2,000 horses have been afflicted and the distribution of these equine cases does not closely correspond to that of the human cases.

Another strange characteristic of the present epidemic is the almost state-wide distribution of cases, the great majority being in the country districts. Few have been reported from the larger cities. Frequently only one of two cases are reported from the same locality.

We know certain facts about this encephalitis. We know it is a virus disease, one characteristic of which is that the organism requires living cells for perpetuation. When the host and the method of spread are understood, we shall be able to eliminate the disease. To determine this requires funds. A few thousand dollars at this time would tide over the investigative type of work being done now by the State Board of Health, funds for which at the present writing are lacking.

## INTERNATIONAL MEDICAL ASSEMBLY

ONE of the largest medical meetings of the year is the International Medical Assembly of the Inter-State Postgraduate Medical Association of North America. This has been true for two decades or more. This year the Assembly meets in Minneapolis for five full days beginning October 13.

The meetings will be held in the Minneapolis auditorium and will continue through each evening except Wednesday, when the annual assembly dinner for members and ladies will be held.

The Saturday preceding and the one following the Assembly will be devoted to clinics to be held in the Minneapolis hospitals. These are being arranged by Dr. T. J. Kunseth and Dr. A. C. Kerkhof. Dr. Charles E. Proshek is local chairman of the Minneapolis committees.

News of the death, August 20, of Dr. William B. Peck of Freeport, Illinois, for years the managing director and dynamic force which has been responsible for the success of the Assembly, will be a shock to the many physicians of the Northwest who knew him. Dr. Arthur B. Sullivan of Madison, Wisconsin, who for several years has been Dr. Peck's right-hand man, will be acting managing director for the Minneapolis meeting.

The complete scientific program of the Minneapolis Assembly appears in this issue of the JOURNAL. It is perhaps needless to say that an unusual opportunity will be afforded physicians of Minnesota and the Northwest to see and hear many of the outstanding clinicians of Canada and the United States.

## THE PUBLIC HEALTH EDUCATION COMMITTEE OF THE STATE MEDICAL ASSOCIATION

THIS reorganized committee held a well attended meeting in Duluth on Saturday, July 19. As now constituted, this committee is a disseminating agency for any and all information the active research committees, such as tuberculosis, diabetes, fracture and cancer, desire to publicize. The chairmen of these respective committees are thereby members of the general committee on Public Health Education.

The committee's chief agencies for publicity include. "The Subject of the Month" program, College Lecture Courses, Weekly News Services, and Dr. William A. O'Brien's invaluable radio programs. The first avenue is primarily for doctors. It was pointed out that if the contents of the packets are to be utilized by such lay teaching agencies as public health nurses, the editing thereof must keep in mind the scope of training and understanding to which nurses attain. The second group, of College Lectures, aims to reach the teachers as well as college level groups, and must compete with the massed slugs of compressed intellectual pabulum fired at students by most professors.

The third agency invites those vending news to make use of as much as they wish of available information and material. In proportion as it is newsworthy it is noticed. It is difficult to know beforehand the items that help sell news. For example, encephalitis among horses in Fargo made but a minor appeal; but if a harassed police chief in a large city may implement his possibility gangster-threatened position with an en-

cephalitic brainstorm, it may help divert political lightning from metropolitan Minnesota to the Dakota wheat fields. The fourth (radio) outlet, so long as Dr. William O'Brien devotes his charm and versatility to it will, of course, outstrip all the rest. He invites suggestions not only from our committee but from you who read and listen, as well. Either write to Dr. O'Brien at the University, or to Mr. Rosell at the Society office in the Lowry Building, Saint Paul. All channels of propaganda and opinion building are running at flood tide. As the stream tones down in more peaceful days to come, we may hope that permanent values will profit by listening habits acquired in blitzkrieg cycles.

—E. L. T.

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## ALCOHOLICS ANONYMOUS

THE unusual organization known as Alcoholics Anonymous is what its name implies and is made up of former alcoholics whose membership is not made public. The organization has no officers and no dues and its sole purpose is rescuing unfortunate alcoholics from their deplorable condition.

The majority of human beings can take one drink and stop there. A small percentage of individuals, but by no means a negligible number throughout the length and breadth of our country can't drink in moderation and make up the group known as alcoholics, dypsomaniacs or just plain "drunks." These people keep deluding themselves with the idea that they can drink in moderation, and they become a problem to themselves as well as to their relatives and friends. They periodically have an inexplicable and irresistible craving for a drink and they are off on a bout. Alcohol may have a different effect on these individuals than on the rank and file, but the psychic element plays an important rôle. It is claimed that many of them seek escape from unpleasant reality in the numbing effect of alcohol.

The alcoholic has always been a problem and doubtless always will. Various methods of treatment have been applied—legal, medical, psychic and religious. By and large, the results have not been very satisfactory.

Alcoholics Anonymous takes a somewhat different approach to this important and difficult problem. Doctors have realized that medicine can do nothing permanently for these unfortunates unless the individual wants to cease drinking. He must not only want to stop for the time being but he must be convinced that he cannot drink in moderation and must admit that total abstinence is the only answer to his problem. Alcoholics Anonymous realizes this fact but adds to it the helping hand of a group who have known the difficulties from personal experience.

The organization was started in 1934 in Akron, Ohio, by a local physician and a New York broker, both alcoholics, who conceived the idea of helping others. The organization has spread all over the country, having various sized groups in many of the larger cities, including the Twin Cities.

The psychology associated with Alcoholics Anonymous is interesting. In the first place the down-and-outer must admit that he cannot fight alcohol alone and must seek assistance. The physician may be needed in an individual case to supervise a period of sobering up before cerebration is reëstablished. Then, if he so desires, a note dispatched to P. O. Box 3452, Saint Paul, or 594, Minneapolis, will bring two or three members of the organization to call on him and reach a helping hand. If he means business he will be called on frequently and may attend group meetings, where he feels the psychic strength incident to the group. One or two episodes of backsliding may be tolerated, but he is dropped from membership in case of repeated offenses, for one of the purposes of the society is the acquiring of new members and assisting another alcoholic gives added strength to the members.

Alcoholics Anonymous is so obviously what it pretends to be, is so free from monetary consideration, being supported by occasional gifts and the sale of a book by the Alcoholic Foundation, and gives such opportunity for the spiritual, religious, and economic rehabilitation of these unfortunates, that the medical profession should know more about the organization and coöperate whenever possible. Literature in the form of a pamphlet and a book entitled "Alcoholics Anonymous" are obtainable from The Alcoholic Foundation, P. O. Box 658 (Church Street), New York City.

### RETURN YOUR INFORMATION CARD FOR THE DIRECTORY PROMPTLY

About September 1, an information card was sent from the headquarters office of the American Medical Association to every physician in the United States and Canada. The information secured is to be used in compiling the Seventeenth Edition of the American Medical Directory.

The directory is prepared at regular intervals in the Biographical Depatmernt of the American Medical Association. The last previous edition appeared in 1940. This volume is one of the most important contributions of the American Medical Association to the work of the medical profession in the United States; it has been especially valuable in the medical preparedness program. In it, as in no other published directory, are dependable data concerning physicians, hospitals, medical organizations and activities. The directory provides full information concerning medical colleges, specialization in the field of medical practice, memberships in special medical societies, tabulations of medical journals and medical libraries and, indeed, practically every important fact concerning the medical profession in which any one might possibly be interested.

Before filling out the information card, read the instructions carefully. Physicians are especially urged to state whether or not they are on extended active duty for the medical reserve corps of the United States Army and Navy. Fill out the card and return it promptly whether or not a change has occurred in any points on which information is requested. If a change of address occurs before March 1, 1942, report it at once. Should you fail to receive a card before the first of October, write at once to the headquarters office stating that fact and a duplicate card will be mailed.

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Says Nature to Physic what pity that we
Who ought to be friends should so seldom agree.
With medical legions my humours they chase,
Till pallid resentment appears on my face;
Aperients, astringents, narcotics, combine
To thwart and oppose me in every design;
And by volleys of pills discharg'd at my head
My strength is exhausted, my energy dead.
But Physic should know I am not to be taught
By severe flagellation to do as I ought;
That my faults may be mended by gentle correction
To which science and talents must give the direction.

—Nature and Physic, Professional Anecdotes, 1825
Rep. in Can. Med. Assn. Jour., July, 1939.

## Communication

### STATE DEPARTMENT OF HEALTH

To the Medical Profession of Minnesota:

At the request of the Minnesota State Medical Association the State Board of Health is coöperating in the conduct of a state-wide maternal mortality survey to begin August 1, 1941, and is asking physicians to *make immediate reports* to the State Board of Health of *all deaths of mothers connected with pregnancy.*

Briefly, the survey will consist, first, of field studies of the case history of all maternal deaths by an obstetrician sent out from the State Board of Health and secondly, analysis of the case studies by a Committee of Physicians. This Committee, as appointed by the Minnesota State Medical Association, is composed of Drs. R. J. Moe, of Duluth, Chairman, J. C. Litzenburg, A. Louis Dippol, and Viktor O. Wilson of Minneapolis, E. C. Hartley of St. Paul, R. D. Mussey of Rochester, Wm. H. Rumpf of St. Cloud, W. F. Mercil of Crookston, and B. O. Mork of Worthington.

This survey is prompted by recognition of the exceptionally low maternal death rate now prevailing in Minnesota. The State rate for 1940 of 2.2 deaths per 1,000 live births is the lowest ever recorded, and compares favorably with rates of highly specialized demonstration services.

The present rate is a 65 per cent reduction from that of 1920 when 6.2 mothers died for every 1,000 infants born alive. This reduction is a medical accomplishment of such high order that it may be aptly regarded as "reaching the goal" visioned twenty years ago by obstetricians and public health authorities. Minnesota can be justly proud of this record which deserves special study and place in the medical literature of the State.

On behalf of the Minnesota State Medical Association and the State Board of Health you are urged to immediately report maternal deaths to the State Board of Health by mail, or by phone if in the Twin Cities; and to give the field physician studying a death you may have reported your hearty coöperation in this laudible undertaking.

Respectfully,
A. J. CHESLEY, M.D.,
*Secretary and Executive Officer.*

July 30, 1941.

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*Health is the second blessing that we mortals are capable of—a blessing that money cannot buy.*—IZAAK WALTON.

# MEDICAL ECONOMICS

**Edited by the Committee on Medical Economics**
**of the**
**Minnesota State Medical Association**
**George Earl, M.D., Chairman**

## DR. SINAI'S PROGRAM—1941

It is interesting to observe the changing tone manifested by popular articles on the subject of health insurance.

Only a few years ago, enthusiasm of the advocates ran at white heat, especially in the literary periodicals. Hopeful reformers fell upon the insurance principle for distribution of costs for medical service as upon a revelation. They admitted no dangers, saw no short-comings. Physicians were distressed and bewildered chiefly because of the ignorance of medicine and human nature which were so naively displayed.

The article called "But Health Insurance Is Different," by Dr. Nathan Sinai which appears in the current *Harpers* shows, however, that discussion of the question has progressed a great way toward a more mature and realistic understanding of the problems involved.

### Drew Up Michigan's First Plan

Dr. Sinai has long been interested in the insurance method of payment for medical expense. It was he who, with Dr. Henry Luce of Michigan, evolved the first health insurance plan, forerunner of the present Michigan Medical Service, which was considered and shelved in 1934 by the Michigan State Medical Society. Dr. Sinai served before that on the Committee of Costs of Medical Care which reported in 1932 and, though he continues as professor of Hygiene and Public Health at the University of Michigan, he has, by his own confession, made medical economics his main interest in life.

### Restricting Early Hopes

It is clear that Dr. Sinai and the early enthusiasts no longer expect health insurance to end all of the problems of the sick nor to translate the American doctor and patient promptly and painlessly into a fee-less medical Utopia. Careful studies by medical organizations, and latterly by actuarial experts, plus a considerable body of experience, have modified early enthusiasms and restricted early hopes. For that change of attitude physicians and the social planners, as well, owe a debt of gratitude to organized medicine which insisted vigorously upon looking before it leaped.

Like many other state medical organizations, the Minnesota State Medical Association is continuously studying the question and observing plans already in operation under medical sponsorship in many parts of the country. Unlike many of them, its Committee on Sickness Insurance has not yet proposed any insurance plan for Minnesota and may never do so. It will undoubtedly base its policy upon experience and results elsewhere, omitting costly trial and error experiments here.

### Course More Cautious

Those who read the exhaustive actuarial study by Mr. Wendell Milliman, published recently in these columns, will applaud that course. They will be interested, too, in reading the Sinai article and in noting that Dr. Sinai's recommendations for 1941 have unmistakably been influenced by such studies. His assumption that "the battle for health insurance is over" seems a little premature; but he plots a far more cautious course, nevertheless, than his predecessors in the lists and displays a healthy recognition of some of the pitfalls involved.

As a first step in his program, Dr. Sinai suggests inclusion of hospitalization and physicians' services for surgical and obstetrical cases only. The importance of medical cases is granted, he says; but until there are better methods of control, the inclusion of this class of patients is a threat to solvency.

### Home Care Second

As a second step—"after enough time has gone by to permit those who are running the plan to acquire administrative experience and to correct

defects of organization"—he feels that the health insurance should embody services to general practitioners in offices and homes.

Home and office care is emphasized, he says, for its preventive value in early diagnosis and treatment. To this he suggests adding a much more extensive use of the visiting nurse as an aid to the doctor, as a means of public education and to reduce hospitalization costs.

His medical insurance program would then cover the surgeon, the obstetrician, the general practitioner and the visiting nurse, together with the hospitals for surgical and maternity cases.

### "Clean Cut Program"

"These," he says, "constitute a clean cut program for medical care that may be covered by health insurance with reasonable safety. More is necessary but much more needs to be known before all of the other special services outside and inside the hospital can be added."

Just how the necessary administrative controls are to be applied in his program is not even touched upon. Nor does he tackle the matter of premium charges to the subscriber, a rock upon which several programs are already beginning to flounder, since a premium sufficient for adequate medical service is proving more difficult than many planners had anticipated to sell.

### No One Can Say

Dr. Sinai's conclusions are interesting, however.

"No such modest program will satisfy those who visualize sweeping changes in the present form of medical service as well as in the method of payment," he says. "No one can say what will be the pattern of practice twenty-five or fifty years hence. The present system may be wholly right, partially right, partially wrong or wholly wrong, but nevertheless, it exists. Rightly or wrongly the great majority of physicians are averse to becoming salaried employes and they insist that their compensation shall be in the form of fees for the services they render. As already stated, there is an important place for experimental plans, for laboratories where different methods of practice and of payment may be tried out and analyzed. Under laboratory conditions one may easily correct an error which might prove disastrous if it were made in a system with millions of subscribers and thousands of physicians.

### Neither Angels Nor Fools

"Health insurance is in motion and behind it there is a dynamic power that has its source in the increasing public demand for relief from the economic hazard of sickness. There are those who, living in their little world of absolutes, regard the word 'change' as a synonym for 'calamity.' There are others who see in the demand the possibility of a quick and complete solution to all of our problems of health. But those who try to translate public demand into the minute details of organization, administration and costs for millions of people, approach the problem with the healthy apprehension it deserves. They are neither angels nor fools, they are realists; and the task is huge."

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## DISTRIBUTE THE DOCTORS

The problem of supplying physicians for civilian medical services in the defense emergency is resolving itself into a question of redistribution in Minnesota.

This conclusion is drawn by state medical association officials after careful study of civilian defense problems in the state.

The ratio of doctors to the population is larger here than in many other states and larger than the ratio regarded as necessary by most experts for adequate medical service to the civilian population.

The relatively small number thus far called to active military duty can be spared without seriously disturbing home medical services.

### An Uphill Climb

The trouble, according to state authorities, is that too many young doctors, especially, have been settling in the large cities and too few have been willing to practice in the rural districts.

Many of these young men must struggle hard to gain a foothold in the larger centers; some of them never succeed in overcoming the keen competition and all are engaged in a long uphill climb before they can command a satisfactory urban practice. More of them could and should be persuaded to go out into the rural districts.

Some method of demonstrating the advantages of practice outside the urban centers is necessary for young doctors in Minnesota.

### Rewards of Country Practice

With good roads and widely distributed modern hospitals all over the state, country practice carries with it few of the burdens and hardships that marked it for the country practitioner of a generation ago. By the same token it carries great rewards in security, pleasant community relationships and the knowledge that the doctor who undertakes it is filling a great and permanent need.

## MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

### PHYSICIANS LICENSED JULY 11, 1941

*June Examination*

Anderson, Richard Audrey, U. of Minn., M.B. 1940, M.D.1941, 2914 Newton Ave. N., Minneapolis, Minn.

Ausman, Duane Robert, U. of Minn., M.B. 1941, Sacred Heart Hospital, Spokane, Wash.

Bateman, James Gordon, U. of Minn., M.B. 1941, Alameda Co. Hospital, Oakland, Cal.

Bowers, Gordon Gill, U. of Minn., M.B. 1940, M.D. 1941, 444 Newton Ave. S., Minneapolis, Minn.

Brown, Frank Jerome, Marquette U., M.D. 1941, 235 W. Spring St., Chippewa Falls, Wis.

Bryan, Donald Irvin, U. of Minn., M.B. 1941, Wm. J. Seymour Hospital, Eloise, Mich.

Caldwell, Hayes W., Med. Col. of Va., M.D. 1938, Mayo Clinic, Rochester, Minn.

Carlson, Norman Carl, U. of Minn., M.B. 1941, Gillette Hospital, Saint Paul, Minn.

Clarke, Edward Treadwell, U. of Texas, M.D. 1939, Mayo Clinic, Rochester, Minn.

Conklin, Roscoe Edward, U. of Colo., M.D. 1935, Minneapolis Gen. Hospital, Minneapolis, Minn.

Conway, John Edward, U. of Wis., M.D. 1940, Ancker Hospital, Saint Paul, Minn.

Cundy, Donald Thomas, U. of Minn., M.B. 1941, Ancker Hospital, Saint Paul, Minn.

Dailey, Walter Charles, Rush Med. Col., M.D. 1939, East Grand Forks, Minn.

Demong, Charles Vincent, Syracuse U., M.D. 1938, Mayo Clinic, Rochester, Minn.

Drake, Emerson Hadley, Columbia U., M.D. 1941, St. Luke's Hospital, Morningside Heights, New York City, N. Y.

Egan, Sherman, Northwestern, M.B. 1939, M.D. 1940, Mayo Clinic, Rochester, Minn.

Evans, Charles Howard, Jr., McGill U., M.D. 1937, Mayo Clinic, Rochester, Minn.

Fox, William Richard, U. of Manitoba, M.D. 1941, Rugby, N. D.

Fulton, Alfred Miller, Jr., U. of Minn., M.B. 1940, Northwest Clinic, Minot, N. D.

Gates, Wright Addison, U. of Minn., M.B. 1940, M.D. 1941, 425 6th St. S.E., Minneapolis, Minn.

Grotting, John Kolben, U. of Minn., M.B. 1941, Detroit Receiving Hospital, Detroit, Mich.

Halper, Bernard, U. of Minn., M.B. 1941, Wayne Co. Hospital, Eloise, Mich.

Henslin, Merrill Edgar, U. of Minn., M.B. 1941, The California Hospital, Los Angeles, Cal.

Heyerman, Oscar T., Northwestern, M.B., 1940, M.D. 1941, Northwestern Hospital, Minneapolis, Minn.

Hogan, Clifford William, U. of Minn., M.B. 1939, M.D. 1940, Kensington, Minn.

Howe, Newell Willard, U. of Minn., M.B. 1941, Milwaukee Co. Hospital, Wauwatosa, Wis.

Ingalls, Edgar George, Jr., U. of Minn., M.B. 1941, Jersey City Medical Center, Jersey City, N. J.

Iverson, Herman Alexander, Johns Hopkins, M.D. 1941, Johns Hopkins Hospital, Baltimore, Md.

Johnson, Roger Harry, U. of Wis., M.D., 1939, Mayo Clinic, Rochester Minn.

Kaasa, Laurin Juul, U. of Minn., M.B. 1941, Ancker Hospital, Saint Paul, Minn.

Kendall, Rodney Frederick, U. of Minn., M.B. 1941, St. Mary's Hospital, Duluth, Minn.

King, John Robert, U. of Minn., M.B. 1941, Westfield, Mass.

Knight, Edwin Graham, U. of Minn., M.B. 1939, M.D. 1940, Randall, Minn.

Lampe, Margaret Ruth, U. of Minn., M.B. 1941, Tyler, Minn.

Lindeke, Harold Irving, U. of Minn., M.B. 1941, Medical Center, Jersey City, N. J.

Love, Robert Campbell, U. of Minn. M.B., 1939, M.D. 1940; Glenwood City, Wis.

McCaffrey, Fabian John, Jr., U. of Minn., M.B. 1940, M.D. 1941, 2749 Stevens Ave., Minneapolis, Minn.

McGroarty, Brian John, U. of Minn., M.B. 1940, M.D. 1940, Easton, Minn.

McNairy, Donald J., U. of Louisville, M.D. 1939, Mayo Clinic, Rochester, Minn.

Moehn, John Thomas, Creighton, M.D. 1941, Ancker Hospital, Saint Paul, Minn.

Moore, Orville Morris, U. of Neb., M.D. 1938, 225 W. 5th St., York, Neb.

Musgrove, James Edward, U. of Manitoba, M.D. 1939, Mayo Clinic, Rochester, Minn.

Nelson, Carleton Alexander, U. of Minn., M.B. 1941, Minneapolis Gen. Hospital, Minneapolis, Minn.

Olsen, Ralph Lormar, U. of Minn., M.B. 1941, 856 University Ave., Saint Paul, Minn.

Peterson, John William, U. of Minn., M.B. 1941, Kings Co. Hospital, Brooklyn, N. Y.

Pumala, Erven Enzio, U. of Minn., M.B. 1940, M.D. 1941, St. Barnabas Hospital, Minneapolis, Minn.

Ravits, Harold G., U. of Minn., M.B. 1941, Wayne Co. Hospital, Eloise, Mich.

Rosenow, John Henry, Harvard, M.D. 1938, Mayo Clinic, Rochester, Minn.

Sloan, Benjamin C., U. of Minn., M.B. 1941, General Hospital of Fresno County, Fresno, Cal.

Steiger, Elmer Edward, U. of Wis., M.D., 1940, Nopeming, Minn.

Strauss, Eugene Cecil, Hahnemann, Phila., M.D. 1940, Grand Marais, Minn.

Tenen, Max Marcus, U. of Minn., M.B. 1941, 2301 Oak Park Ave. N., Minneapolis, Minn.

Tudor, Richard Beresford, U. of Minn., M.B. 1941, Duke Hospital, Durham, N. Car.

Thill, Leonard Joseph, Marquette, M.D., 1941, Fennimore, Wis.

Vaudreuil, William Francis, U. of Wis., M.D. 1940, Miller Hospital, Duluth, Minn.

Watson, Richard Edward, U. of Minn., M.B. 1940, M.D. 1941, 1044 Lowry Med. Arts Bldg., Saint Paul, Minn.

Wentink, Elaine Anne, U. of Minn., M.B. 1941, Gallinger Hospital, Washington, D. C.

Zagaria, James Francis, U. of Minn., M.B. 1940, Santa Fe Hospital, Topeka, Kansas

*By Reciprocity*

Berg, Walter Richard, Marquette U., M.D. 1926, Gillet, Wis.

Lookanoff, Victor Alexander, Rush Med. Col., M.D. 1934, Middle River, San Hawthorne, Wis.

Spencer, Philip Lawrence, U. of Iowa, M.D. 1939, Mounds Park Hospital, St. Paul, Minn.

*National Board Credentials*

Brooks, Samuel McLeod, Harvard U., M.D. 1936, Mayo Clinic, Rochester, Minn.

Fawcett, Robert Magwood, U. of Pa., M.D. 1940, Starkweather, N. D.

Gullingsrud, Miles Joseph, Orlando, Harvard U., M.D. 1939, Thief River Falls, Minn.

Ould, Carlton Lee, Duke U., M.D. 1937, Duke Hospital, Durham, N. Car.

# INDUSTRIAL HEALTH

**Edited by the Committee on Industrial Health and Occupational Diseases**
**J. L. McLeod, Grand Rapids, Chairman**

H. B. Allen, Austin
L. S. Arling, Minneapolis
G. L. Berdez, Duluth
T. G. Clement, Duluth
W. S. Lemon, Rochester
T. A. Lowe, South Saint Paul
R. I. Rizer, Minneapolis
S. E. Sweitzer, Minneapolis
O. H. Wangensteen, Minneapolis
A. E. Wilcox, Minneapolis

## THE FEET BENEATH THE MEN BEHIND THE WHEELS OF INDUSTRY

Foot disturbances may be classified briefly as congenital or acquired imperfections; diseases or traumatic conditions of bones, joints, muscles, nerves and skin; paralytic or circulatory impairments; and tumors.

Over a five-year period, approximately one-half of male industrial workers (ages from late second to early eighth decades) who are employed at standing or walking occupations will consult their first aid or medical service about foot complaints. The majority of these are seen two or more times and the complaints are caused by myotic infections, flat-feet, painful heels, ingrown toenails, painful calluses, corns, metatarsalgia, and common acquired deformities. Not many of the conditions are disabling, but they affect the worker's effort and disposition to a degree which noticeably alters his work output as well as quality. Doctors agree that few patients show as much facial expression of satisfaction as those who limp into the office with painful calluses, corns, and other minor foot complaints which are readily amenable to treatment.

### Injuries

Foot injuries are more common off than on the job because only one-fourth of the workman's time is spent actually at work and many workmen wear protective steel-toed shoes while at work. Crushing injuries to the toes and metatarsal region from falling objects impinging the feet against the floor are the most frequent cause of foot disability resulting from injury. Concerted effort of the plant safety unit with instruction to the men on availability of steel-toed shoes at no greater cost than regular shoes and safe methods of handling such material as might cause hazard can eliminate those dangers. Sharp objects such as nails projecting from boards on floors frequently penetrate thin-soled shoes and carry dirt, particles of leather or shreds of dirty socks into any of the plantar, intermetatarsal or dorsal fascial spaces, may cause tendon, nerve and bone injuries or give rise to staphylococcus, streptococcus, gas bacillus, or tetanus infections. Surgical consideration of foot and ankle injuries and deformities is well covered by Callander[1] and by Lewin.[2]

### Proper Shoes

Proper shoes and foot hygiene are essential foot insurance. A shoe should be made on a straight last and should have a round toe and a heel of moderate height. It should be narrow in the heel and through the waist of the foot, but wide through the ball. The shank must not be too wide or too narrow. The rigidity and flexibility varies with the person and his defects. The contours should not cause irritation. Little difficulty is experienced in obtaining properly shaped shoes for children and men, but girls and women are the victims of style, vanity, and the shoe salesman. They prefer to fit the eye rather than the foot.[2] Corrective modifications may be made to suit individual needs by use of the Thomas or reversed. Thomas heel, elevation of outer border of sole, use of metatarsal bar or crescent, Hauser metatarsal comma bar, or Lewin tilted, notched, rubber metatarsal crescent, all of which require a flexible shank to produce the correct relation of sole to heel. Painful heels may be relieved of pressure areas by splitting or cutting out necessary sections. The internal modifications of shoes include inserts, steel bars, rigid uppers, the removal of toe caps, the removal of counters, use of patch pockets, and pressure pads. Felt pads of numerous designs may be used to support and to relieve pressure.

### Foot Hygiene

Foot hygiene includes frequent bathing, wearing of shoes and hosiery which allow sufficient ventilation of feet, trimming of toenails straight across, treatment of skin diseases and nail deformities, and avoidance of constriction by shoes, garters, or hosiery.[2]

### References

1. Callander, C. Latimer: Surgical Anatomy. pp. 777-813. Philadelphia: W. B. Saunders Co., 1939.
2. Lewin, P.: The Foot and Ankle. Philadelphia: Lea and Febiger, 1940.

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of May 4, 1941

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, May 14, 1941. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the president, Dr. John M. Armstrong.

There were fifty-two members and one guest present.

Minutes of the April meeting were read and approved as read.

There was no business to come before the society, so the scientific program followed.

Dr. W. A. Hanson read the following paper. Lantern slides were shown.

## RELAPSING FEBRILE NODULAR NONSUPPURATIVE PANNICULITIS

W. A. Hanson, M.D., and

L. H. Fowler, M.D. (by invitation)

*Minneapolis*

Since the original description of this disease by Victor Pfiefer[11] in 1892 only three cases occurring in males and seventeen in females have been recorded in the literature. In 1916 in this country Gilchrist[8] and Ketron published their findings in a similar case, followed by Weber[17] in 1925 who gave an excellent description of the disease. H. A. Christian[6] in 1928 observed the fourth case and added the term febrile. He also ventured the opinion that it should be called a syndrome rather than a disease.[6] Additions to the literature have been made by Alderson and Way,[1] Nethertone,[9] Binkley,[4] Brill,[5] Reed,[12] Anderson,[13] Cummings[7] and Lever,[7] Schaffer[11] and Weber,[15] while the last two cases were reported by I. L. Tilden, Gotshalk and Avokin[16] in 1940.

The disease is characterized by recurring attacks of malaise, usually fever of varying degrees and usually with relapses.[4] There is an inflammation of the panniculus adiposus with nodular distribution, generally with pain but without suppuration.[17] The patient is usually seriously ill.[5]

The nodules are either plainly visible or if not are easily felt on deep palpation. They may show various degrees of erythema, a mottled brawny pigmentation with tenderness on palpation and may undergo spontaneous regression.[4] As a result of this process there is localized atrophy, sharply circumscribed depressions in the contour of the skin[6] and a marked scarring appearance.

In the acute stages of the disease there is reddening of the epidermis with no other changes to be observed. On completion of the process the skin manifests a normal appearance.

As a rule, no pathologic changes are found in other parts of the body, although in Brill's case there was an enlarged spleen.[12]

The etiology of the disease is unknown,[13] although in the earlier reports iodides and bromides were mentioned as etiological factors.[17] These were not observed in the later cases reported.[16] One may argue that the cause is infection or toxins, which would be difficult to explain inasmuch as the skin, fascia and muscles are not involved in the process.[6] Probably a filterable virus may be a factor in the production of the disease or syndrome.[3]

Most of the patients were inclined towards obesity.[4] The age incidence was from eight to sixty-four years.[1,10] The blood showed a relative lymphocytosis, leukopenia and negative cultures.[7] The blood cholesterin and total lipase content were within normal limits.[4]

The nodules, excised tissue and aspirated material have shown no organisms on cultures or smears.[4] There has been no indication of any disturbances of the fat metabolism.

The diagnosis is usually not difficult especially in the second and third stages of the disease. One might confuse it with erythema nodosum, erythema induration or subcutaneous sacroid of Darier and Roussy,[7] but in none of these diseases is there atrophy of the subcutaneous fat without changes in the skin.[7] Adiposus dolorosa, nodular syphilis and migratory phlebitis may resemble the disease. According to Binkley,[4] who observed the disease first in both breasts and later elsewhere in the body, it might be confused with multiple fibro-adenoma, and the isolated nodules may show skin attachments analogous to carcinoma of the breast. In any case, biopsy will prove the diagnosis.

*Pathologic Picture.*—Most observers report that the epidermis shows very little change, while a few have described a slight increase in the vascularity with a perivascular exudate. Gilchrist and Ketron[8] expressed the opinion that in this disease an unknown cause leads to a change in the subcutaneous fat; the metamorphosed fat acts then as a foreign body and calls forth a foreign body inflammatory reaction.[7]

The subcutaneous fat shows an infiltration by dense perpendicular strands of connective tissue.[8] This is also observed between and in the fat cells. Cumens and Lever believe the macrophages composed the greater proportion of the infiltrating cells with an occasional monocyte present.[7]

These macrophages are large cells with foamy cytoplasm filled with small vacuoles. Their nuclei may have one or more nuceoli. These macrophages have also been observed in the spaces between the fat cells and by confluence form giant cells with ten or more nuclei in some areas. They may be within the capsule and replace the fat cells. A peculiar areolar collagenous[7] tissue was also observed where the fat had disappeared, and associated with this were lymphocytes, plasma cells, monocytes, fibroblasts and a few polymorphonuclear cells. Areas of necrosis were also present. The vessels[10] in the subcutaneous and connective tissue and among the fat cells generally appeared more

numerous. The vessels were dilated and thickened by perivascular fibrosis, edema, infiltration of the lymphoid cells and macrophages. The walls of the vessels were also separated. Thus the procedure of events is as follows: the fat cells are invaded and digested by

Fig. 1. Photograph of the right and left extremities. There is a relative increase in size of the right knee joint area due to slight flexure. At *A* is seen a slight depression at the site of the original lesion. At *B* note the depression due to the loss of the subcutaneous tissue.

the macrophages, and after the digestion of the fat cells become necrotic, followed by invasion of the lymphocytes, monocytes and fibroblast cells.[10] The inflammatory tissue gradually loses its many nuclei and becomes fibrotic and contracture ensues, so that in the first two stages we have a palpable nodule, while in the third stage the depression of the skin develops.[10]

*Prognosis.*—From the previously reported cases relapses are the rule.[1,15] Some writers have recorded patients with ten or more recurring attacks of the disease, extending over a period of several years.[6] Relatively few patients die of the disease.

*Treatment.*—Most authorities advocate evacuation by aspiration or drainage of the affected areas, high vitamin intake and iron. There is no specific therapy for the disease.

## Report of Case

January 28, 1940, H. W. H., a male, white, twenty-eight years of age, single, by occupation a purchasing agent, presented himself with the following complaint. For several weeks he had noted a dull intermittent pain and localized tenderness above the inner aspect of the right knee. This did not disable him from his usual occupation.

His family history was irrelevant.

*Previous Diseases and Operations.*—He had had diphtheria, mumps and chickenpox as a child without complications; tonsillectomy at the age of eight years and a fracture of the right wrist at the age of sixteen years. He stated he had injured his knees by "over-lifting" in 1926 from which he made a good recovery.

In 1933 he had had a urological investigation which revealed a nonspecific seminal vesiculitis from which he later completely recovered.

Appendectomy had been performed in 1937 for a recurrent appendicitis in a retrocecal appendix.

*Clinical History.*—He informed us that during the past several weeks he had had dull, intermittent pain associated with tenderness over the inner aspect of the right lower thigh. Recently they had become more severe and pronounced. There had been no fever. He also complained of malaise and intervals of unexplained dizziness. No history of recent accident, trauma or injury to the extremity could be obtained. His history by systems otherwise was essentially negative.

*Physical Findings.*—This well developed man was five feet eleven inches in height and 182 pounds in weight. His blood pressure registered 122 systolic and 70 diastolic in mm. of mercury. His pulse was 72 per minute, and his temperature registered 98.6° F. Eyes and ears were normal on examination and the tonsils had been well removed. There were no masses found in the neck. The heart and chest were normal. The abdomen revealed a well healed right lower rectus scar, but no masses or tenderness on palpation. There were no hernias. The genitalia were negative, and on rectal examination the prostate and seminal vesicles were normal.

The right knee showed the motions to be within normal limits, and on palpation a slight tenderness was noted over the inner lower surface of the thigh.

*Laboratory Findings.*—Examination of the urine was negative. The blood revealed the hemoglobin 89 per cent, and the red and white counts were within normal. His blood Wassermann was negative. The intradermal tuberculin test showed no response. X-rays of the chest and the right lower extremity showed no evidence of disease.

*Treatment and Subsequent Course.*—He was treated conservatively for a period of two months with moist hot packs and a heat lamp. On March 21, 1940, he stated his thigh was more tender and there was an extension of the process at a higher level over the medial surface of the thigh. Examination of the extremity showed the process had extended to the upper inner half of the thigh, and there was a rather firm sensation on palpation of the affected areas. He had no fever.

He was referred to Dr. S. E. Sweitzer for consultation and he gave the patient a series of x-ray treatments, diet and high vitamin medication. However, there was no improvement.

On May 10, 1940, he was seen again. At this time he was acutely ill. His temprature was 100.8° F., and his pulse was 96 per minute. He complained of extreme weakness, dizziness and more tenderness just above the knee joint area. On examination the knee joint area was somewhat enlarged, and there was also slight swelling of the inner surface of the right thigh just above the knee and an enlarged inguinal lymph node. He was hospitalized and treated conservatively by elevation of the extremity and continuous hot moist packs. A few days later under novacaine anesthesia an attempt was made to aspirate the area, but no fluid was obtained. A posterior leg splint was applied and the previous treatment again was carried out. After a ten-day interval, he was discharged from the hospital.

On June 30, 1940, he reentered the hospital for observation and exploration of the area affected. The area now was thought to be semi-fluctuant, was pig-

mented and had extended further anteriorly, superiorly and posteriorly over the lower thigh. Under gas anesthesia the site was explored. The subcutaneous tissue appeared rather firm and of waxy consistency. No fluid was encountered. The underlying fascia and structures appeared normal. Cultures were obtained from the area and also a section of the adipose tissue for culture and biopsy. The wound was closed without drainage and dry dressings applied. A report on the cultures and smears showed no organisms. The excised tissue on microscopic section showed inflammatory tissue with moderate connective tissue present with many lymphocytes, plasma cells, macrophages and a few giant cells.

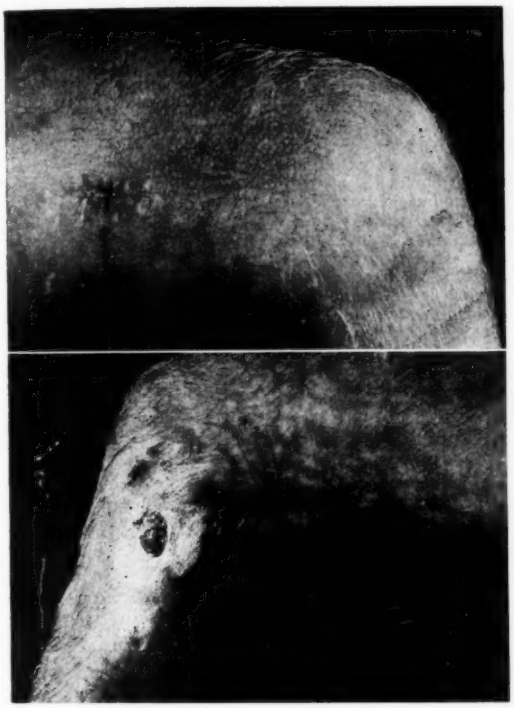

Fig. 2. *(Above)* View of inner aspect of the right lower thigh. Arrow shows the area of biopsy and depression in the contour of the skin at the site of the original lesion.

Fig. 3. *(Below)* Right knee joint area. Areas of ulceration following spontaneous eruption of third area of relapse.

On July 12, 1940, the wound began to drain rather marked amounts of brownish oily fluid, which on repeated smears and cultures revealed no organisms present. He was discharged from the hospital after ten days. Inasmuch as the previous investigations were essentially negative and we had observed this oily exudate, our attention was directed toward the diseases of the panniculus adiposus. Several similar cases had previously been reported. The area was completely healed by October, 1940, with a small area of depression in the contour of the skin. His condition and complaints were about the same until November 16, 1940, when he had the second relapse over the outer upper area of the right thigh, accompanied by a fever of 102° F. At this time the area was reddish and raised. A few days later the area was aspirated under local anesthesia obtaining 300 c.c. of brownish gray rather thick fluid, which on culture again showed no organisms. This area drained several days and was finally well healed in three weeks with a large area of depression present.

On January 8, 1941, he had the third relapse involving the right calf of the leg and the outer and under surface of the knee. These had the same characteristic appearances as the previous lesions but spontaneously ruptured with a discharge of brownish oily exudate, which was again negative on bacteriological investigation. The ulcerated areas measured 1x2, 1.5x2, and 3x4 cm. in diameter with large areas of the skin undermined and overhanging. The blood cholesterol at this time was 166.6 mg. per 100 c.c., and the serum lipase .4 c.c. n/20 sodium hydroxide per c.c. serum, the latter being considered normal; the blood sugar was 87.5 mg. per 100 c.c. The treatment was the same as previously carried out. However, we believed large soft compression sponges over the dressings, reinforced by elastic bandages, would hasten the healing of the areas, which later proved the case. By April 26, 1941, the areas were completely healed, with large areas of depression in the contours of the skin over the upper, outer and lower medial aspects of the thigh, likewise over the calf of the right leg and posterior knee joint spaces, which on examination show a marked loss of the subcutaneous tissue. The brawny pigmentation is disappearing, and he is generally much improved without any complaints at the present time.

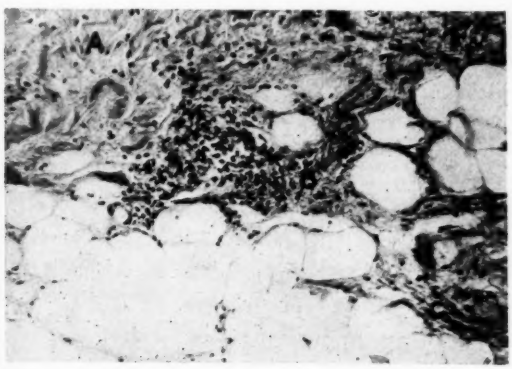

Fig. 4. High power x4 magnification. Section from biopsy in Figure 3. At *A* note the dense fibrous connective tissue below the epidermis; at *B* area of infiltration of lymphocytes and plasma cells. These areas have replaced the normal subcutaneous fat. *C* areas of normal subcutaneous fat.

*Comment*—We wish to report the fourth case of relapsing febrile nodular nonsuppurative panniculitis occurring in the male and twenty-first in the combined series, the characteristic clinical and pathological findings being similar to the previously reported cases.

One is impressed with the very limited investigative work previously carried out on panniculus adiposus; likewise that the structure possesses definite physiological functions and properties and that it can also have certain pathological variations.[19]

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### Discussion

DR. S. E. SWEITZER, Minneapolis: Panniculitis is a rare condition and is often seen first by the dermatologist. Dr. Hanson's patient was seen by me and was given filtered -xray, without much benefit. We know nothing of the cause of this disease and little about the treatment. The cases should be reported as seen and in time something may be found out about them. Dr. Hanson has done some very good work in this case even if his investigations were negative.

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## TERMINAL ILEITIS WITH PERFORATION

### Report of Case

H. B. ZIMMERMANN, M.D.
*Saint Paul*

The patient was a boy fifteen years old, admitted to the hospital on April 12, 1941.

The history began just about a year ago when he was admitted to the hospital for the first time on May 21, 1940. At that time he had an acute abdomen, diffusely painful, exquisitely tender, with the point of maximum tenderness in the right lower quadrant of the abdomen, where was also the area of maximum rigidity. His temperature was 102°, leukocyte count 9,200, other blood findings normal. He kept high right leg flexed, abdomen quiet and fixed.

His previous history was that for years he would have moderately severe abdominal cramps, with some looseness of the bowels. The attacks were never incapacitating, never kept him home from school.

Three days before his first admission he had rather violent colicky pains; the day before admission he had a severe attack of pain, with all the signs of peritoneal irritation.

I made a diagnosis of acute appendicitis with perforation. At operation there was free pus in the abdomen, the peritoneum was severely inflamed, and the appendix was quite normal. On the anterior surface of the ileum, about three inches from the cecum, there was a perforation to which was adherent a tag of omentum.

The perforation was closed with a suture, the omentum fastened to it, and the wound closed. After a stormy convalescence, he recovered. At the end of three months he went back to school for a short time, when he again began to have trouble—severe attacks of abdominal pain and diarrhea, and gradual loss of weight.

The family refused operation until April 12, 1941. By this time the boy was emaciated, more or less dehydrated, and cyanotic; and was vomiting from what seemed to be a complete ileus. He was given intravenous solutions of sugar, some blood plasma, and his gastrointestinal tract was decompressed by Wangensteen's suction. He improved very much, but still had several fistulæ through the old scar.

At the end of fifteen days he was again operated upon, the abdomen was opened through a long right rectus incision. After separating a mass of adherent omentum and viscera, the lower ten inches of the ileum was found thickened and contracted so there was practically no lumen; the mesentery was shrunken so that it was only about 1.5 inches deep and contained large inflammatory nodes, one of which had broken down, and there was a fistula extending from it to the transverse colon. The entire mass, including about 11 inches of ileum, the descending colon, and about 9 inches of the transverse colon, was resected and a lateral anastomosis was made between the good ileum and the transverse colon.

The patient made a very good recovery and was discharged from the hospital two and a half weeks from the day of operation.

The histological sections of the bowel show a marked dilatation of all the lymph vessels and lymph spaces, especially in the sub-mucosa and the muscularis.

This case illustrated very well the thesis of Reichert and Mathes, who, in 1936, produced this condition experimentally by destroying the lymphatic drainage of the small bowel by injecting sclerosing solutions into the lymph vessels of the mesentery, producing by this means an elephantiasis of the bowel.

(Slides were shown)

### Discussion

DR. ROBERT EARL, Saint Paul: About two and a half years ago I operated upon a woman who had had three previous laparotomies for right lower quadrant symptoms.

When I first saw her, she had a mass in the right lower quadrant with almost complete obstruction. There was tenderness and some swelling above the crest of the right ileum.

At operation about 10 inches of the distal ileum, the cecum, and proximal half of the ascending colon were inflamed. The mesentery was edematous and the lymph nodes were enlarged. On separating the cecum and the ascending colon from the right abdominal wall, a post-cecal abscess was encountered which had developed from a perforation in the cecum and involved the abdominal muscles attached to the ileum. The distal 16 inches of ileum, cecum, and the ascending and hepatic flexure of the colon were brought out through the right rectus incision, clamped, excised, and treated as Mickulicz operation on the sigmoid.

The patient made a nice recovery and has remained well except that fifteen months ago she developed an obstruction of the ileum in the left upper quadrant from undetermined cause. This obstruction was relieved by a longitudinal incision of the ileum which was closed transversely, with uneventful recovery.

DR. A. A. ZIEROLD, Minneapolis: It seems to me that in all of the comment made on enteritis, one fact has been neglected, viz., that it is rarely reported in autopsy findings. As the condition is by no means a rare find-

ing at operation, it would appear logical to believe that many cases must occur and also recover without treatment. On such assumption. I would suggest that in the absence of obstruction, abscess, or fistula, acute enteritis does not demand surgical treatment. In five instances I have demonstrated the uncomplicated condition at operation, and have refrained from resection or enterostomy and, in each, recovery occurred. Subsequent x-ray examination revealed no demonstrable change in intestinal lumen or motility.

Dr. Zimmermann, in closing: I am inclined to think that Dr. Zierold is right—some patients with regional ileitis do get well. I am now watching two patients who seem to be improving. I am quite certain, however, that this child would have died had not the involved intestine been removed and an anastomosis made.

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## PARADUODENAL HERNIA
### Report of Case

E. Mendelssohn Jones, M.D.
*Saint Paul*

The duodenal fossa was first described by Hensing in 1742. Bordenave in 1779 and Neubauer in 1786 reported cases of duodenal hernia but in 1857 Treitz published the classical description of the anatomy of this hernia establishing the importance of internal hernia into the peritoneal fossa. In 1937 Longacre reviewed the literature and found 140 cases. Moynihan described nine fossæ in which internal hernias may be found.

The superior duodenal fossa is the upper part of the duodenojejunal fossa originally described by Treitz and is present in 40 to 50 per cent of all subjects. It may exist alone although it is usually associated with an inferior duodenal fossa. The superior duodenal fossa lies to the left of the ascending duodenum opposite the level of the second lumbar vertebra. This fossa is bounded above by the superior duodenal fold which presents a semilunar ring that merges on the right into the peritoneum that covers the ascending duodenum and on the left with the peritoneum in front of the left kidney. The inferior mesenteric vein nearly always corresponds to the ponit of junction between the superior duodenal fold and the parietal peritoneum. Treitz also described the inferior duodenal fossa and it is the most constant of the duodenal fossa, being present in 70 to 75 per cent of all subjects. It is situated on the left side of the ascending duodenum opposite the third lumbar vertebra. When the superior and inferior duodenal fossa coexist they share a single orifice which is generally oval in shape. Occasionally there is an extension of the fossa behind the ascending duodenum and this presents a large fossa that is particularly liable to become the site of a hernia.

In the case to be presented, the hernia occurred in the mesentericoparietal fossa. This fossa was described in 1874 by Waldeyer. He pointed out that the formation of this fossa was due to the raising up of a peritoneal fold by the superior mesenteric artery. This fossa is rarely found excepting in the fetus and the newly born. It is usually situated behind the superior mesenteric artery just below the duodenum. Waldeyer felt that it was possible that this variety of fossa accounted for some of the reported cases of hernia into the mesentery or through rents in the mesentery.

### Report of Case

A twenty-year-old male who was first seen at the Ancker Hospital on September 9, 1940, complained of having epigastric pains and vomiting which were not related to meals but were relieved somewhat by catharsis. Dizzy spells with faintness and some memory loss were associated with muscular effort and physical strain. There was no unconsciousnes or epilepiform symptoms. Examination was essentially negative except for moderate tenderness over the epigastrium and the upper right quadrant of the abdomen. An x-ray study of the gall bladder showed normal response and no evidence of biliary calculi. X-ray examination of the gastro-intestinal tract showed the stomach and duodenum to be negative but the small bowel study was reported as suggestive of a paraduodenal hernia. A second x-ray study confirmed the findings of the first examination and a diagnosis was made of a right-sided paraduodenal hernia. Because the symptoms were increasing and the attacks of epigastric distress were so frequent that he could not carry on his work, he was admitted to the surgical service and he was operated upon January 30, 1941. At the operation the duodenojejunal area was exposed and a large part of the small intestine was found to have passed through an opening beneath the superior mesenteric artery and into the mesentericoparietal fossa. The opening into the fossa was large and, as there were no adhesions between the coils of intestines and the wall of the sac, the hernia was readily reduced. It was felt that a more satisfactory repair could be made if the sac was removed and because of the large opening, removal of the sac seemed feasible. This was accomplished without difficulty. The peritoneal edges were then sutured, care being taken not to injure the superior mesenteric artery. The postoperative course was uneventful and the patient states that the symptoms of which he complained have disappeared and he has returned to work.

The symptoms of nonstrangulated duodenal hernia are very indefinite and are usually limited to slight digestive disturbances. It has been stated that very few are diagnosed except at operation that is performed for symptoms thought to be those of intestinal obstruction and the hernia is found when search is made for the point of obstructions. Undoubtedly by careful x-ray examination and the gastro-intestinal tract more of these hernias will be detected preoperatively and surely the important feature of this case was the pre-operative x-ray diagnosis of a paraduodenal hernia.

### Discussion

Dr. A. Colvin, Saint Paul: Dr. Jones has covered the ground very thoroughly. I would like only to emphasize that so far as we were concerned the diagnosis was made by x-ray. I don't believe I would feel like making a diagnosis of this condition unless I had x-ray pictures. When we first saw this boy it was quite doubtful as to what was the matter with him. We wanted to observe him for some time. So far as symptoms were concerned there was a rather mild character to his pains, compared with the severe nausea and very little vomiting extending over a long period of time.

Dr. Arnold Schwyzer, Saint Paul: This kind of hernia is rare. I want to report an unusual case of a left-sided paraduodenal hernia.

*(Continued on Page 801)*

## International Medical Assembly

**Inter-State Postgraduate Medical Association of North America**

**October 13-17, 1941**

**Pre-assembly Clinics, Saturday, October 11**
**Post-assembly Clinics, Saturday, October 18**
**Minneapolis Hospitals**
**MINNEAPOLIS, MINNESOTA**

### Monday, October 13

**8:00 A.M.**

Diagnostic Clinic: "Modern Treatment of Syphilis."
**Dr. Paul A. O'Leary,** Professor of Dermatology and Syphilology, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

Diagnostic Clinic: "The Management of Intra-thoracic Tumors."
**Dr. John Alexander,** Professor of Surgery, University of Michigan School of Medicine, Ann Arbor, Michigan.

Diagnostic Clinic: "Pancreatic Hepatic Syndrome."
**Dr. Warren H. Cole,** Professor of Surgery, University of Illinois School of Medicine, Chicago, Illinois.

Diagnostic Clinic: "Goiter."
**Dr. Robert S. Dinsmore,** Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Undulant Fever."
**Dr. Chester S. Keefer,** Wade Professor of Medicine, Boston University School of Medicine, Boston, Massachusetts.

*Noon Intermission*

**1:00 P. M.**

Diagnostic Clinic: "Maintenance of Nutrition in Surgical Patients."
**Dr. Isidor S. Ravdin,** George Leib Harrison Professor of Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.

Diagnostic Clinic: "Medical Treatment of Gallstones and Cholecystitis."
**Dr. John H. Musser,** Professor of Medicine, Tulane University School of Medicine, New Orleans, Louisiana.

Address: "Coronary Artery Disease."
**Dr. A. Carlton Ernstene,** Head of the Cardiorespiratory Department, Cleveland Clinic, Cleveland, Ohio.

Address: "Cruciate Ligaments of the Knee Joint; Etiology, Pathology, Symptoms, Repair."
**Dr. William R. Cubbins,** Clinical Professor of Bone and Joint Surgery, Loyola University School of Medicine, Chicago, Illinois.

Address: "Migraine."
**Dr. Carl D. Camp,** Professor of Neurology and Chairman of the Department, University of Michigan School of Medicine, Ann Arbor, Michigan.

Address: "Uterine Bleeding."
**Dr. Emil Novak,** Associate Professor of Obstetrics, University of Maryland School of Medicine, Baltimore, Maryland.

Address: "Recent Advances in Our Knowledge of Tetanus."
**Dr. Warfield M. Firor,** Associate Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Address: "Pitfalls in X-ray Diagnosis."
**Dr. Harold D. Kerr,** Professor of Radiology, State University of Iowa School of Medicine, Iowa City, Iowa.

*Dinner Intermission*

**7:00 P.M.**

Address: "High Concentration of Oxygen in Surgery."
**Dr. Charles W. Mayo,** Assistant Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

Address: "Possibilities of Attainment in the Conservation of Hearing."
**Dr. Horace Newhart,** Professor of Otology, Rhinology and Laryngology, University of Minnesota School of Medicine, Minneapolis, Minnesota.

Address: "Anesthesia and Surgery."
**Dr. Erwin R. Schmidt,** Professor of Surgery, University of Wisconsin School of Medicine, Madison, Wisconsin.

Address: "Psychoses of Different Age Levels."
**Dr. Louis J. Karnosh,** Associate Clinical Professor of Nervous Diseases, Western Reserve University School of Medicine, Cleveland, Ohio.

Address: "Virus Diseases."
**Dr. Robert G. Green,** Professor of Bacteriology, University of Minnesota Medical School, Minneapolis, Minnesota.

Address: "Hypertension and the Surgical Kidney."
**Dr. William F. Braasch,** Professor of Urology, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

### Tuesday, October 14

**8:00 A. M.**

Diagnostic Clinic: "Stones in the Upper Urinary Tract."
**Dr. C. Donald Creevy,** Assistant Dean and Associate Professor of Surgery and Urology, University of Minnesota School of Medicine, Minneapolis, Minnesota.

Diagnostic Clinic: "Diseases of the Lungs in the Aged."
**Dr. James G. Carr,** Professor of Medicine, Northwestern University School of Medicine, Chicago, Illinois.

Diagnostic Clinic: "Carcinoma of the Stomach."
**Dr. George P. Muller,** Professor of Surgery, Jefferson Medical College, Philadelphia, Pa.

Diagnostic Clinic: "Neuritides."
**Dr. John C. McKinley,** Professor of Medicine and Nervous and Mental Diseases, University of Minnesota Medical School, Minneapolis, Minn.

Diagnostic Clinic: "Endocrine Problems in the Male."
**Dr. Willard O. Thompson,** Clinical Professor of Medicine, Rush Medical College of the University of Chicago, Chicago, Illinois.

*Noon Intermission*

*(Continued on Page 786)*

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*(Continued from Page 784)*

**1:00 P. M.**

Diagnostic Clinic: "Management of Cardiac Patients Who Require Surgery."
**Dr. Herrman L. Blumgart,** Associate Professor of Medicine, Harvard Medical School, Boston, Massachusetts.
Diagnostic Clinic: "Management of Complicated Fractures of the Extremities."
**Dr. Clay Ray Murray,** Associate Professor of Surgery, Columbia University College of Physicians and Surgeons, New York, New York.
Address: "The Prevention and Medical Treatment of Preëclamptic and Eclamptic Toxemia of Pregnancy."
**Dr. Soma Weiss,** Hersey Professor of the Theory and Practice of Physic, Harvard Medical School, Boston, Massachusetts.
Address: "The Rôle of the General Practitioner in the Prevention of Blindness."
(The Schneider Foundation Eye Presentation)
**Dr. Harry S. Gradle,** Professor of Ophthalmology (Extra Mural), Northwestern University School of Medicine, Chicago, Illinois.
Address: "Purpura."
**Dr. Ernest H. Falconer,** Clinical Professor of Medicine, University of California School of Medicine, San Francisco, California.
Address: "Cause and Treatment of Circulatory Failure in Surgery."
**Dr. Dallas B. Phemister,** Professor of Surgery, University of Chicago, The School of Medicine, Chicago, Illinois.
Address: "The Treatment of Injuries to the Peripheral Arteries with Particular Reference to Arteriovenous Fistula."
**Dr. Emile F. Holman,** Professor of Surgery, Stanford University School of Medicine, San Francisco, California.
Address: "The Diagnosis and Surgical Management of Brain Tumors."
**Dr. Alfred W. Adson,** Professor of Neurosurgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.

*Dinner Intermission*

**7:00 P. M.**

Address: "Diagnosis and Treatment of Wounds of the Heart."
**Dr. Daniel C. Elkin,** Joseph B. Whitehead Professor of Surgery, Emory University School of Medicine, Atlanta, Georgia.
Address: "The Parathyroids and Diseases of the Bones."
**Dr. Thomas P. Sprunt,** Professor of Clinical Medicine, University of Maryland School of Medicine; Visiting Physician, Johns Hopkins Hospital, Baltimore, Maryland.
Address: "Prostatic Obstruction."
**Dr. William E. Lower,** Cleveland Clinic, Cleveland, Ohio.
Address: "Nonoperative Treatment of Acute and Chronic Sinus Disease."
**Dr. George E. Shambaugh, Jr.,** Associate Clinical Professor of Laryngology and Otology, Rush Medical College, Chicago, Illinois.
Address: "The Use of Pedicle Muscle Crafts in Obliterating Non-tuberculous Empyema Cavities."
**Dr. Howard K. Gray,** Assistant Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.
Address: "Disturbances of the Vascular System in Pregnancy."
**Dr. John L. McKelvey,** Professor of Obstetrics and Gynecology, University of Minnesota School of Medicine, Minneapolis, Minnesota.

**Wednesday, October 15**
**8:00 A. M.**

Diagnostic Clinic: "Regional Ileitis."
**Dr. Claude F. Dixon,** Associate Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.
Diagnostic Clinic: "Types of Clinical Nutritional Deficiency."
**Dr. Virgil P. W. Sydenstricker,** Professor of Medicine, University of Georgia School of Medicine, Augusta, Georgia.
**Diagnostic Clinic:** "Bleeding Peptic Ulcers."
**Dr. Roscoe R. Graham,** Assistant Professor of Surgery, University of Toronto Faculty of Medicine, Toronto, Canada.
Diagnostic Clinic: "The Itching Skin."
**Dr. Oliver S. Ormsby,** Clinical Professor of Dermatology, Rush Medical College, Chicago, Illinois.
Diagnostic Clinic: "Surgery of the Biliary Tract."
**Dr. Frank H. Lahey,** Lahey Clinic, Boston, Mass.

*Noon Intermission*

**1:00 P. M.**

Diagnostic Clinic: "Differential Diagnosis and Treatment of Anemia."
**Dr. Russell L. Haden,** Cleveland Clinic, Cleveland, Ohio.
Pathological Clinical Conference:
Participants:
**Dr. Henry M. Winans,** Professor of Medicine, Baylor University College of Medicine, Dallas, Texas.
**Dr. Virgil P. W. Sydenstricker,** Professor of Medicine, University of Georgia School of Medicine, Augusta, Georgia.
**Dr. E. T. Bell,** Professor of Pathology, University of Minnesota Medical School, Minneapolis, Minn.
**Dr. Owen Wangensteen,** Professor of Surgery, University of Minnesota School of Medicine, Minneapolis, Minnesota
**Dr. Leo G. Rigler,** Professor of Radiology, University of Minnesota School of Medicine, Minneapolis, Minnesota.
**Address:** "Postoperative Pulmonary Complications."
**Dr. Elliott C. Cutler,** Moseley Professor of Surgery, Harvard Medical School, Boston, Mass.
Address: "Plastic Operations on the Lower Urinary Tract for Congenital Deformities."
**Dr. Hugh H. Young,** Professor of Urology, Johns Hopkins University School of Medicine, Baltimore, Maryland.
Address: "Significance of Convulsions."
**Dr. Walter E. Dandy,** Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore, Maryland.
Address: "Treatment of Gonadal Hypofunction in the Female."
**Dr. Elmer L. Sevringhaus,** Professor of Medicine, University of Wisconsin School of Medicine, Madison, Wisconsin.
Address: 'Some of the Advantages of Closed Anastomosis in Gastro-intestinal Resections."
**Dr. Owen H. Wangensteen,** Professor of Surgery, University of Minnesota School of Medicine, Minneapolis, Minnesota.

**ASSEMBLY DINNER**

**7:00 P.M.—Informal**

**For members of the profession, their ladies and friends.**

**Dr. Roscoe R. Graham,** President of the Inter-State Postgraduate Medical Association of North America—Master of Ceremonies.

*(Continued on Page 788)*

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*(Continued from Page 786)*

**Thursday, October 16**

**8:00 A. M.**

Diagnostic Clinic: "Burns and Reconstruction Surgery."
**Dr. N. Logan Leven,** Assistant Professor of Clinical Surgery, University of Minnesota School of Medicine, St. Paul, Minnesota.
Diagnostic Clinic: "Unexplained Fever."
**Dr. J. Murray Kinsman,** Associate Professor of Medicine, University of Louisville School of Medicine, Louisville, Kentucky.
Diagnostic Clinic: "Diverticulitis."
**Dr. John F. Erdmann,** Attending Surgeon, New York Postgraduate Medical School, New York, New York.
Diagnostic Clinic: "The Etiology and Treatment of Nephrosis in Children."
**Dr. Irvine McQuarrie,** Professor of Pediatrics, University of Minnesota School of Medicine, Minneapolis, Minnesota.
Diagnostic Clinic: "Cancer of the Colon."
**Dr. Thomas E. Jones,** Cleveland Clinic, Cleveland, Ohio.

*Noon Intermission*

**1:00 P. M.**

Diagnostic Clinic: "Clinical Demonstration of Cases Illustrating the Common Types of Arthritis and the Present Status of Therapy."
**Dr. Ralph Pemberton,** Professor of Medicine, University of Pennsylvania Postgraduate School of Medicine, Philadelphia, Pennsylvania.
Diagnostic Clinic: "Automobile Injuries."
**Dr. John J. Moorhead,** Professor of Clinical Surgery, New York Postgraduate Medical School, New York, New York.
Address: "The Rise and Fall of Focal Infection."
**Dr. Russell L. Cecil,** Professor of Clinical Medicine, Cornell University Medical College, New York, New York.
Address: "Bronchiectasis."
**Dr. Evarts A. Graham,** Professor of Surgery, Washington University, School of Medicine, St. Louis, Missouri.
Address: "Pneumonia."
**Dr. Hobart A. Reimann,** Magee Professor of Practice of Medicine and Clinical Medicine, Jefferson Medical College, Philadelphia, Pennsylvania.
Address: "Osteomyelitis."
**Dr. Frank R. Ober,** Assistant Dean and John B. and Buckminster Brown Clinical Professor of Orthopedic Surgery, Harvard Medical School, Boston, Massachusetts.
Address: "Cesarean Section."
**Dr. John R. Fraser,** Professor of Obstetrics and Gynecology, McGill University Faculty of Medicine, Montreal, Canada.
Address: "Physiological Studies on the Usefulness of Helium in Respiratory Mixtures."
**Dr. Maurice B. Visscher,** Professor of Physiology, University of Minnesota Medical School, Minneapolis, Minnesota.

*Dinner Intermission*

**7:00 P. M.**

Address: "Peritonitis."
**Dr. Frederick A. Coller,** Professor of Surgery, University of Michigan School of Medicine, Ann Arbor, Michigan.
**Address:** "Heredity in the Clinic."
**Dr. Lewellys F. Barker,** Professor Emeritus of Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland.
Address: "Subcutaneous Injuries of the Abdomen."
**Dr. Frederick Christopher,** Associate Professor of Surgery, Northwestern University School of Medicine, Evanston, Illinois.
Address: "Renal Tuberculosis."
**Dr. Herman L. Kretschmer,** Clinical Professor of Surgery (Genito-Urinary), Rush Medical College, Chicago, Illinois.
Address: "Present Status of Surgery of the Heart."
**Dr. Claude S. Beck,** Associate Professor of Surgery, Western Reserve University School of Medicine, Cleveland, Ohio.
Address: "Pre-operative Preparation for Gastro-intestinal Surgery."
**Dr. Verne C. Hunt,** Clinical Professor of Surgery, University of Southern California School of Medicine, Los Angeles, California.
Address: "Clinical Use of Digitalis."
**Dr. Peter T. Bohan,** Professor of Medicine, University of Kansas School of Medicine, Kansas City, Missouri.

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**Friday, October 17**

**8:00 A. M.**

Diagnostic Clinic: "Nervous Exhaustion as a Cause of Gastro-intestinal Symptoms."
**Dr. Walter C. Alvarez,** Professor of Medicine, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.
Diagnostic Clinic: "The Problem of Difficult Hernias."
**Dr. W. Wayne Babcock,** Professor of Surgery and Clinical Surgery, Temple University School of Medicine, Philadelphia, Pennsylvania.
Diagnostic Clinic: "Differential Diagnosis of Jaundice."
**Dr. Wallace M. Yater,** Professor of Medicine and Director of the Department, Georgetown, University School of Medicine, Washington, D. C.
Diagnostic Clinic: "Ulcerative Colitis."
**Dr. Richard B. Cattell,** Lahey Clinic, Boston, Massachusetts.
Diagnostic Clinic: "The Treatment of Diabetes of Long and Short Duration."
**Dr. Elliott P. Joslin,** Clinical Professor of Medicine, Harvard Medical School, Boston, Mass.

*Noon Intermission*

**1:00 P. M.**

Diagnostic Clinic: "Cancer of the Breast."
**Dr. Frank E. Adair,** Assistant Professor of Clinical Surgery, Cornell University Medical College, New York, New York.
Diagnostic Clinic: "Ascites."
**Dr. Leroy H. Sloan,** Professor of Medicine, University of Illinois College of Medicine, Chicago, Illinois.
Address: "Adrenal Tumors."
**Dr. Waltman Walters,** Professor of Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minnesota.
Address: "Prevention of Rickets with a Small, Single Parenteral Administration of Vitamin $D_3$."
**Dr. Henry J. Gerstenberger,** Professor of Pediatrics, Western Reserve University School of Medicine, Cleveland, Ohio.
Address: "Head Injuries."
**Dr. Eric Oldberg,** Professor of Neurology and Neurological Surgery, University of Illinois School of Medicine, Chicago, Illinois.
Address: "Acute and Chronic Glomerulonephritis."
**Dr. E. T. Bell,** Professor of Pathology, University of Minnesota Medical School, Minneapolis, Minn.

## EAST CENTRAL MINNESOTA MEDICAL SOCIETY

Dr. W. A. O'Brien, professor of preventive medicine and public health at the University of Minnesota School of Medicine, addressed a meeting of the East Central Minnesota Medical Society in Cambridge, August 6. His subject was "Pasteurized Milk." Presiding was Dr. D. E. McBroom of Cambridge, society president.

## NORTHERN MINNESOTA MEDICAL ASSOCIATION

Dr. Emmet Heiberg of Fergus Falls was elected president of the Northern Minnesota Medical Association at the annual meeting in St. Cloud last month. He succeeds Dr. J. F. Dubois of Sauk Center.

Other officers named are: Dr. R. N. Jones of St. Cloud, vice president; and Dr. Clarence Jacobson, Chisholm, secretary-treasurer.

Bemidji was selected as the 1942 convention city.

## P. S. PELOUZE AWARD

The American Neisserian Medical Society announces an annual prize of one hundred dollars, to be known as the P. S. Pelouze Award, to be presented to the person under thirty-five years of age who, in the opinion of the Committee of Awards, has made the outstanding contribution to the control of the gonococcal infections during the preceding year.

Nominations for the award should be sent to the Secretary not later than March 31 of each year. The winner will be announced at the subsequent annual meeting of the Society. Nominations their year should be sent to Oscar F. Cox, M.D., 475 Commonwealth Ave., Boston, Massachusetts.


**CASE HISTORY No. 102**

**CHEILITIS FROM LIPSTICK**

Mrs. P. W. W.—. Symptoms: Lips fissured, scaling and dry. Advised all cosmetics be discontinued. After one week condition cleared. Patient asked for and permitted use of lipstick. Eruption reappeared. Patch tests revealed bromo acid in lipstick used reacted positively. AR-EX non-permanent lipstick prescribed. After 3 years' use, with subsequent resumption of all other cosmetics, no cutaneous reactions recurred.

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*For the local Treatment of Acute Anterior* **Urethritis**

(DUE TO NEISSERIA GONORRHEAE)

**SILVER PICRATE***

*A complete technique of treatment and literature will be sent upon request*

*Silver Picrate, Wyeth, has a convincing record of effectiveness as a local treatment for acute anterior urethritis caused by Neisseria gonorrheae.[1] An aqueous solution (0.5 percent) of silver picrate or water-soluble jelly (0.5 percent) are employed in the treatment.

1. Knight, F., and Shelanski, H. A., "Treatment of Acute Anterior Urethritis with Silver Picrate," Am. J. Syph., Gon. & Ven. Dis., **23**, 201 (March), 1939.

*Silver Picrate is a definite crystalline compound of silver and picric acid. It is available in the form of crystals and soluble trituration for the preparation of solutions, suppositories, water-soluble jelly, and powder for vaginal insufflation.

**JOHN WYETH & BROTHER, INCORPORATED, PHILADELPHIA**

# OF GENERAL INTEREST

Dr. Herbert Boysen has taken over the practice of Dr. Everett B. Coulter at Madelia.

* * *

Dr. R. E. Murray assisted Dr. Arthur J. Lewis of Henning, while the latter was on his vacation.

* * *

Dr. Ben Sommers has opened suburban offices at 2062 Ford Parkway, Highland Village, Saint Paul, for the practice of internal medicine.

* * *

Dr. A. E. Osterberg of Rochester attended a meeting of the Committee on Chemical Service to Medicine, American Chemical Society, in New York City, July 25.

* * *

Drs. J. W. Mader and G. F. Schmitt of Rochester, reserve officers in the United States Navy, have been assigned for service on the *U.S.S. Solace.*

* * *

Dr. Karl E. Johnson of Duluth has been called to active duty with the United States Navy, and has been assigned to the Marine base hospital at San Diego, California.

* * *

Dr. William C. Bernstein announces the opening of offices at 934 Lowry Medical Arts Building, Saint Paul. His practice will be limited to diseases of the rectum and colon.

* * *

Dr. Richard P. Virnig of New Richland has received an appointment as Acting Assistant Surgeon for intern training in the Medical Corps in the Navy, with rank of Lieutenant (junior grade).

* * *

When the Upper Des Moines Medical Society held its annual summer meeting at Templar Park and Spirit Lake, Iowa, July 10, speakers included Drs. John B. Erich, Walter C. Alvarez and William R. Lovelace of Rochester.

* * *

In coöperation with the Minnesota Society for the Prevention of Blindness, the American Medical Association set up an exhibit on the "Prevention of Eye Injuries" at the Minnesota State Fair in Saint Paul, August 24-30.

* * *

Dr. Johannes K. Moen of Minneapolis has been certified by the American Board of Internal Medicine, following the June examinations in Cleveland. Dr. Moen was recently promoted to the position of clinical assistant professor of medicine at the University of Minnesota Medical School.

* * *

Dr. A. Harold Mork has opened offices in the Anoka hospital in Anoka. A graduate of Creighton University medical school in Omaha, he served his internship at Mercy hospital in Council Bluffs, Iowa, and also spent a year at Ancker hospital in Saint Paul. He is the nephew of Dr. Frank E. Mork of Anoka.

Dr. Isabella C. Herb, formerly of the Mayo Clinic, recently retired from the staff of the Presbyterian Hospital in Chicago, and from the faculty of Rush Medical College after thirty-two years as head of the department of anesthetics at both institutions. She has been appointed anesthetist emeritus.

* * *

The Association of Fellows of the Mayo Foundation in Rochester staged a costume barn dance, August 2 at Mayowood, to provide funds to furnish a unit for the R.A.F. Hospital in England, headed by Dr. Archibald H. McIndoe, formerly a fellow in the Mayo Foundation.

* * *

When the American Congress of Physical Therapy and the American Occupational Therapy Association held their annual meetings in Washington, D. C., September 1-5, Dr. Henry L. Williams of Rochester addressed the physical therapy meeting on "Physical Treatment of Indurative Headache."

* * *

Dr. G. W. Clifford of Alexandria announces the formation of the Alexandria Clinic, which will include on its staff Dr. H. L. Stemsrud of Parkers Prairie and Dr. C. Nessa of St. Cloud. Dr. Clifford's offices have been remodeled and enlarged for the clinic, and new equipment has been installed

* * *

Dr. Lawrence Pearson, a native of Hallock, has become associated with Dr. Neil McLean Leitch of Warroad in the practice of medicine. He is a graduate of the University of Minnesota School of Medicine and has served internships at St. Barnabas Hospital in Minneapolis and the Charles T. Miller Hospital in Saint Paul.

* * *

Dr. Henry W. Meyerding of Rochester participated in a special institute on industrial health conducted in several cities of Iowa in June, under the sponsorship of the Iowa State Department of Health and the Iowa State Medical Society. The institute was for the practicing physician, the industrial physician and the industrial manager.

* * *

Dr. George W. Drexler, formerly of Minneapolis, is now associated with Dr. A. H. Borgerson and Dr. M. E. Mosby in the Long Prairie clinic and hospital.

Dr. Drexler, who was graduated from the University of Minnesota medical school and interned at General Hospital in Minneapolis, recently married Miss Frances Prinz of Long Prairie.

* * *

The grant of the National Foundation for Infantile Paralysis to the University of Minnesota for a course in orthopedic nursing has been renewed. Offered by the Department of Preventive Medicine and Public Health, this course will be given during the winter and spring quarters of the 1941-1942 term. It was offered for the first time last term.

*(Continued on Page 792)*

# INTERNATIONAL MEDICAL ASSEMBLY

## Inter-State Postgraduate Medical Association of North America

**Public Auditorium, Minneapolis, Minnesota, October 13, 14, 15, 16, 17, 1941**

**Pre-Assembly Clinics, October 11; Post-Assembly Clinics, October 18, Minneapolis Hospitals**

President, Dr. Roscoe R. Graham
President-Elect, Dr. George R. Minot
Managing-Director, Dr. William B. Peck*
Secretary, Dr. Tom B. Throckmorton
Director of Exhibits, Dr. Arthur G. Sullivan
Treasurer and Director of Foundation Fund, Dr. Henry G. Langworthy
Chairman, Program Committee, Dr. George W. Crile
General Chairman, Minneapolis Committees, Dr. Charles E. Proshek

ALL MEDICAL MEN AND WOMEN IN GOOD STANDING CORDIALLY INVITED

Intensive Clinical and Didactic Program by World Authorities

The following is the list of members of the profession who will take part on the program:

Frank E. Adair, New York, N. Y.
Alfred W. Adson, Rochester, Minn.
John Alexander, Ann Arbor, Mich.
Walter C. Alvarez, Rochester, Minn.
W. Wayne Babcock, Philadelphia, Pa.
Lewellys F. Barker, Baltimore, Md.
Claude S. Beck, Cleveland, Ohio.
E. T. Bell, Minneapolis, Minn.
Herrman L. Blumgart, Boston, Mass.
Peter T. Bohan, Kansas City, Mo.
William F. Braasch, Rochester, Minn.
Carl D. Camp, Ann Arbor, Mich.
James G. Carr, Chicago, Ill.
Richard B. Cattell, Boston, Mass.
Russell L. Cecil, New York, N. Y.
Frederick Christopher, Evanston, Ill.
Warren H. Cole, Chicago, Ill.
Frederick A. Coller, Ann Arbor, Mich.
C. Donald Creevy, Minneapolis, Minn.
William R. Cubbins, Chicago, Ill.
Elliott C. Cutler, Boston, Mass.
Walter E. Dandy, Baltimore, Md.
Robert S. Dinsmore, Cleveland, Ohio
Claude F. Dixon, Rochester, Minn.
Daniel C. Elkin, Atlanta, Ga.
John F. Erdmann, New York, N. Y.
A. Carlton Ernstene, Cleveland, Ohio.
Ernest H. Falconer, San Francisco, Calif.
Warfield M. Firor, Baltimore, Md.
John R. Fraser, Montreal, Canada
Henry J. Gerstenberger, Cleveland, Ohio.
Harry S. Gradle, Chicago, Ill.
Evarts A. Graham, St. Louis, Mo.
Roscoe R. Graham, Toronto, Canada.
Howard K. Gray, Rochester, Minn.
Robert G. Green, Minneapolis, Minn.
Russell L. Haden, Cleveland, Ohio.
Emile F. Holman, San Francisco, Calif.
Verne C. Hunt, Los Angeles, Calif.
Thomas E. Jones, Cleveland, Ohio.
Elliott P. Joslin, Boston, Mass.
Louis J. Karnosh, Cleveland, Ohio.
Chester S. Keefer, Boston, Mass.
H. Dabney Kerr, Iowa City, Iowa.
J. Murray Kinsman, Louisville, Ky.
Herman L. Kretschmer, Chicago, Ill.
Frank H. Lahey, Boston, Mass.
N. Logan Leven, St. Paul, Minn.
William E. Lower, Cleveland, Ohio
Charles W. Mayo, Rochester, Minn.
John L. McKelvey, Minneapolis, Minn.
John C. McKinley, Minneapolis, Minn.
Irvine McQuarrie, Minneapolis, Minn.
John J. Moorhead, New York, N. Y.
George P. Muller, Philadelphia, Pa.
Clay Ray Murray, New York, N. Y.
John H. Musser, New Orleans, La.
Horace Newhart, Minneapolis, Minn.
Emil Novak, Baltimore, Md.
Frank R. Ober, Boston, Mass.
Eric Oldberg, Chicago, Ill.
Paul A. O'Leary, Rochester, Minn.
Oliver S. Ormsby, Chicago, Ill.
Ralph Pemberton, Philadelphia, Pa.
Dallas B. Phemister, Chicago, Ill.
Isidor S. Ravdin, Philadelphia, Pa.
Hobart A. Reimann, Philadelphia, Pa.
Erwin R. Schmidt, Madison, Wis.
Elmer L. Sevringhaus, Madison, Wis.
George E. Shambaugh, Chicago, Ill.
Leroy H. Sloan, Chicago, Ill.
Thomas P. Sprunt, Baltimore, Md.
Virgil P. W. Sydenstricker, Augusta, Ga.
Willard O. Thompson, Chicago, Ill.
Maurice B. Visscher, Minneapolis, Minn.
Waltman Walters, Rochester, Minn.
Owen H. Wangensteen, Minneapolis, Minn.
Soma Weiss, Boston, Mass.
Henry M. Winans, Dallas, Texas
Wallace M. Yater, Washington, D. C.
Hugh H. Young, Baltimore, Md.

**HOTEL HEADQUARTERS**
Hotel Nicollet - Hotel Radisson

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Hotel Committee: A. N. Bessesen, Jr., Chairman, 2000 Medical Arts Bldg., Minneapolis, Minnesota.

**A program will be mailed to every member of the medical profession in good standing in the United States and Canada on or about September first.**

Any member of the profession in good standing who does not receive a program, please write the Managing-Director and one will be mailed.

COMPREHENSIVE SCIENTIFIC AND TECHNICAL EXHIBIT. SPECIAL ENTERTAINMENT FOR THE LADIES

*Deceased, August 20, 1941

*(Continued from Page 790)*

Dr. Maurice N. Walsh of Rochester, as a member of the State Aeronautics Commiss.on, is to be director of Minnesota's proposed glider pilot training program. The Legislative Advisory Committee has made $15,000 available to the commission for preparatory glider activities, if a similar amount be provided by the federal government, for which application has been made.

* * *

Dr. William Rademaker, Detroit Lakes physician, has terminated his association with Dr. H. W. Arndt in the Arndt Clinic in Detroit Lakes and has opened his own offices in that city. A graduate of the University of Minnesota Medical School, Dr. Rademaker formerly practiced in Evansville, and later was head of the bureau of sanatoria of the state division of social welfare. He came to Detroit Lakes last January.

* * *

Dr. David A. Sher of Minneapolis has become associated in the practice of medicine and surgery with Dr. M. M. Hursh in Hibbing, having offices at 1916½ Fourth Avenue East.

Dr. Sher practiced at Cold Spring, Minnesota for four years, and for the past year was in charge of the emergency receiving ward at Minneapolis General Hospital, while doing postgraduate work.

Dr. Philip C. Welton, on August 1, became superintendent of Buena Vista Sanatorium near Wabasha, succeeding Dr. R. R. Hendrickson who resigned to become superintendent of Lake Park Sanatorium near Detroit Lakes, Minnesota. Dr. Welton, formerly on the staff of Nopeming Sanatorium near Duluth, came to Wabasha from Salt Lake City where he was a Utah deputy state health officer.

Dr. K. J. Wakim, who is completing his fellowship in physiology in the Mayo Foundation and who received a degree of Ph.D. in physiology from the University of Minnesota in June, has been appointed associate professor of physiology at Indiana University. Dr. Wakim's teaching and research will be in clinical, fundamental and applied physiology at Bloomington and Indianapolis.

* * *

Among the speakers at the third biennial Rocky Mountain Medical Conference held at the Canyon Hotel in Yellowstone National Park, September 2-4, was Dr. Winchell McK. Craig of Rochester who presented a paper, "Rôle of the Protruded Intervertebral Disk in the Production of Low Back and Sciatic Pain; Reaction of the Central Nervous System to Trauma: Diagnosis and Treatment."

* * *

Dr. V. M. Baich of Minneapolis assisted in the offices of Drs. C. C. Craig and R. H. Monahan in International Falls last month during Dr. Monahan's absence from the city. Dr. Monahan vacationed in Boston and in eastern Canada.

A graduate of the University of Minnesota School of Medicine, Dr. Baich interned at Deaconess Hospital in Minneapolis. He expects to leave soon to accept a commission in the United States Navy.

* * *

Members of the Medical Reserve Corps who have been called to active duty during the past few weeks include:

W. Lee Raverty of Blue Earth, first lieutenant.

Hilbert Mark of Minneapolis, major, to Carlisle Barracks, Pennsylvania.

R. C. Hottinger of Janesville, first lieutenant, to Fort

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WITH PHENOPHTHALEIN OR PLAIN
TASTES "CHOCOLATEY" LIKE THE CHOCOLATE IN A DELICIOUS DESSERT
NO OILY AFTER-TASTE
MIGHT AS WELL MAKE IT A TASTY PRESCRIPTION
I KEEP IT IN THE ICE BOX BECAUSE CHILLING HEIGHTENS "CHOCOLATEY" FLAVOR
ACCEPTED AMERICAN MEDICAL ASSN
MAKE IT A TASTY PRESCRIPTION!
ACCEPTED AMERICAN MEDICAL ASSN

George Wright at Spokane, Washington.
W. E. Anderson of Thief River Falls, captain, to Carlisle Barracks, Harrisburg, Pennsylvania.
Carroll Joseph Bellis of Saint Paul, first lieutenant.
Laurence Mercer Hursh of Hibbing, first lieutenant.
Reuben Berman of Minneapolis, captain.
Lyle Albert French of Minneapolis, first lieutenant.

* * *

Appointment of Dr. D. E. McBroom, superintendent of the Minnesota Colony for Epileptics at Cambridge, as director of a program of mental hygiene and mental testing in the state division of public institutions, is announced by Carl H. Swanson, state director of public institutions.

Dr. Royal C. Gray of Minneapolis, who has served as psychiatrist of state penal institutions since 1938, has been named to succeed Dr. McBroom as acting superintendent. He has been responsible for several years for active conduct of the neuro-psychiatric service at the University Hospitals.

The appointments were effective September 1.

Dr. McBroom, who served as president of the East Central Minnesota Medical Society this year, is a former member of the staff at the School for Feeble-Minded at Faribault and was assistant superintendent from 1922 to 1928, when he was named superintendent of the Cambridge institution.

* * *

From Captain Malcolm R. Johnson, who is doing eye, ear, nose and throat work at the U. S. Army Station Hospital, Fort Riley, Kansas, comes a letter telling of Minnesota medical activities there. He writes:

"Lt. Col. R. W. Whittier, who is head of the department, is a Minnesota graduate. He at one time worked under Dr. Frank Burch. . . My associations here have been very pleasant, and in my practice I have seen an enormous variety of interesting cases. Since our two nurses are from Minnesota too, we have a Minnesota Clinic in the heart of Kansas. Incidentally, our advertisement for Minnesota should rate applause from the Chamber of Commerce."

Captain Johnson practiced at the Interstate Clinic at Red Wing, specializing in eye, ear, nose and throat, before being called to active duty, April 1. He completed his fellowship training at Minneapolis General Hospital last December.

* * *

Dr. Clarence M. Jackson, professor and head of the department of anatomy at the University of Minnesota Medical School, retired at the close of the school year and has been appointed professor emeritus in the department of anatomy. A committee consisting of the following professors has been appointed to administer the department for the coming year: Dr. Edward A. Boyden, chairman, Dr. Andrew T. Rasmussen, and Dr. Hal Downey.

The following members of the faculty retired at the close of the school year: Dr. J. Frank Corbett and Dr. Harry P. Ritchie as clinical professors of surgery; Dr. Walter R. Ramsey, as clinical associate professor of pediatrics; Dr. Orianna McDaniel, as clinical associate professor of preventive medicine and public health; and Dr. Anton G. Wethall, as clinical assistant professor of urology.

In addition, Dr. Horace Newhart, professor of oto-

**St. Petersburg, Russia**
**— FIRST REPORTED CASE OF**
**AMEBIASIS**

**Physicians today are more fully alert in diagnosing amebiasis as they now realize the disease may be found anywhere. Craig[1] examined 49,336 people from all parts of the United States for amebae and found 5,720 (11.6 per cent) to be infested.**

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* Trade Mark Reg. U. S. Pat. Off. Word "Vioform" identifies the product as iodochloroxyquinoline of Ciba's manufacture.
1 Craig, C. F.: Amebiasis and Amebic Dysentery (1934).
2 Zener, F. B., Am. Jl. Surg. 44:416 (1939).

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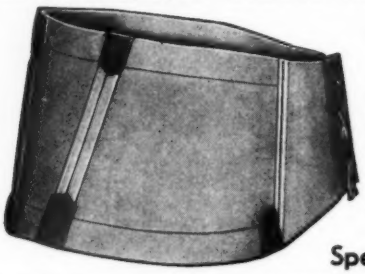

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laryngology and director of the Division of Otology, Rhinology and Laryngology; and Dr. Charles A. Reed, associate professor of orthopedic surgery, resigned from the medical faculty, after many years of service, to devote their time to private practice.

* * *

Five Range physicians, formerly associated with the Rood Hospital system, have purchased the interests of Dr. D. C. Rood, Duluth, retired, and have organized what will be known as the Mesaba Clinic with headquarters in Hibbing. In addition to the new clinic now under construction in Hibbing, the group will operate the Rood Hospital in Chisholm, and dispensaries at Coleraine, Marble, Calumet and Keewatin. The five physicians are Drs. R. L. Bowen, T. A. Estrem, C. F. Carstens of Hibbing; and Dr. E. K. Rowles of Coleraine; and Dr. P. H. MacFarlane of Chisholm.

Associated with them will be Dr. F. E. Giles, Dr. C. W. Ahl, Dr. A. C. Tingdale and Dr. E. W. Zeman of Hibbing; Dr. A. D. Klein and Dr. W. H. Parker of Chisholm; Dr. E. T. Plowman of Marble; Dr. I. H. Kiesling of Coleraine; and Dr. E. H. Loofbourrow of Keewatin. G. H. Hepworth of Hibbing has been named business manager of the clinic.

Dr. Rood, who retired from active practice several years ago, is living in Duluth. He came to the Range in the early days and opened a hospital in a frame building in North Hibbing. As the mining industry expanded, he constructed and maintained offices and hospitals at Calumet, Coleraine, Marble, Nashwauk, Chisholm and Keewatin.

* * *

Medical officers on duty with National Guard units of Minnesota, as listed by headquarters, include:

Einar C. Andreassen, Major, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
Stanley F. Ceplecha, Captain, Redwood Falls, 215th Coast Artillery (AA), Camp Haan, Calif.
Ralph H. Creighton, Captain, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
William J. Eklund, Major, Duluth, 125th Fld. Artil., Camp Claiborne, La.
John S. Hamlon, Capt., St. Charles, 135th Inf. (R), Camp Claiborne, La.
Richard B. Hullsiek, Lieut. Colonel, St. Paul, MD State Staff.
Wyman E. Jacobson, Captain, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
Vilhelm M. Johnson, Captain, Dawson, 135th Inf. (R), Camp Claiborne, La.
Youbert T. Johnson, Major, Minneapolis, 109th Obsn. Squadron.
Herbert W. Jones, Jr., Captain, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
Jacob F. Karn, Captain, St. Paul, 138th Infantry.
Linus F. Leitschuh, 1st Lieut., Red Lake Falls, 217th Coast Artillery (AA).
John D. Lyon, Jr., Captain, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
Leopold G. Samuelson, Major, Mankato, 218th Coast Artillery (AA).
George F. Schmidt, Lieut. Colonel, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
Alf K. Stratte, Captain, Pine City, 125th Field Artillery, Camp Claiborne, La.
Sofus E. Urberg, Capt., Duluth, 125th Fld. Artillery, Camp Claiborne, La.
George A. Williamson, Major, St. Paul, 216th Coast Artillery (AA), Camp Haan, Calif.
Howard H. Wolfe, Captain, St. Paul, 216th Coast Artillery (AA), Camp Haan, Calif.

* * *

Among the fifty new fellows in the Mayo Foundation are: Dr. John H. Flinn of Redwood Falls, who was graduated from Northwestern University School of Medicine and who interned at St. Luke's Hospital in Chicago and at Ancker Hospital in Saint Paul; Dr.

*(Continued on Page 802)*

# In Memoriam

### Jane Hughes Sullivan

Dr. Jane Hughes Sullivan, a practicing physician at Mankato for over a decade and wife of Michael F. Sullivan of Mankato, died suddenly July 29, 1941, at the age of seventy-one. She was the sister of the late Dr. Helen Hughes Hielscher, also of Mankato.

Dr. Sullivan was born at Bedford, P. E. I., Canada, on July 17, 1870, and when a young girl moved to Blue Earth, Minnesota.

She began practice as Dr. Jane Hughes at Mankato in 1902 after receiving her medical degree at the University of Michigan the same year. She continued her practice until about two years after her marriage in 1912 to M. F. Sullivan. During the early years she was in partnership with Dr. J. A. Andrews and Dr. J. S. Holbrook, and later with her sister, Dr. Helen Hielscher. She and her sister founded the Monday Study Club, an organization of Catholic women in Mankato, which celebrated its twentieth anniversary in 1940 and whose membership had grown to thirty during this period.

Surviving are her husband, a daughter Helen, now Sister Mary of Our Lady of Grace, of the Sisters of the Good Shepherd, at Omaha, and a son, Dr. John Sullivan, of Mankato.

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### Joseph R. Kuth

Joseph R. Kuth died in Duluth, at the age of sixty, on August 1, 1941, as a result of lymphatic leukemia. The disease ran a rather chronic course for about four years, but an acute fulminating erythroblastic bone marrow depression caused a rapid decline within a period of four weeks.

J. R. Kuth came from sturdy German stock, and was born in Hartford, Wisconsin. His family moved to Minneapolis at an early date, but he received his preliminary education at St. John's College, near St. Cloud, Minnesota. He was reported as notably brilliant in his classical studies, and maintained throughout his life the keenest interest in the best of the world's literature. He was a particularly keen student of historical events.

His medical education was received at the University of Minnesota, where he graduated in 1904, and came immediately to St. Mary's Hospital, Duluth, as an intern.

In Duluth he came in contact with the late gifted Dr. W. H. Magie, a pioneer surgeon in northern Minnesota, whose practice had a notable number of industrial injuries. Dr. Kuth practiced with Dr. Magie for five or six years in his industrial work, and no doubt that led him into the chosen specialty of orthopedic surgery.

In 1913 and 1914 he did postgraduate work in Austria, Germany and England, and had very close contact with the great Lorenz and the productive school of orthopedists at Liverpool, England. Returning to Duluth, he confined his practice entirely to orthopedic surgery, and with a temperament and intellectual capacity greatly like the late Emil Geist, he had, throughout his life, the greatest confidence of his patients, the respect of the medical profession, and with the Industrial Commission (apropos of many accident cases submitted to him for review) his word carried unusual conviction.

He was honored by medical societies by various offices, and at one time was Chief of Staff for St. Mary's Hospital, Duluth. He was a member of the American Board of Orthopedic Surgery and the Clinical Orthopedic Society and the American Academy of Orthopedic Surgeons.

E. L. TUOHY

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# BOOK REVIEWS

**Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.**

## BOOKS RECEIVED FOR REVIEW

INFANTILE PARALYSIS. A Symposium delivered at Vanderbilt University, April, 1941 (Six lectures). 239 pages. Illus. Price $1.25, cloth. Baltimore: Waverly Press, Inc., 1941.

DOCTORS DON'T BELIEVE IT—WHY SHOULD YOU? Facts and Fallacies About Health with Practical Guidance for the Layman. August A. Thomen, M.D. Introduction by Logan Clendening, M.D., and the Right Honorable Lord Horder, Physician in Ordinary to the King of England. 384 pages. Price, $2.50, flexible binding. New York: Simon & Schuster, 1941.

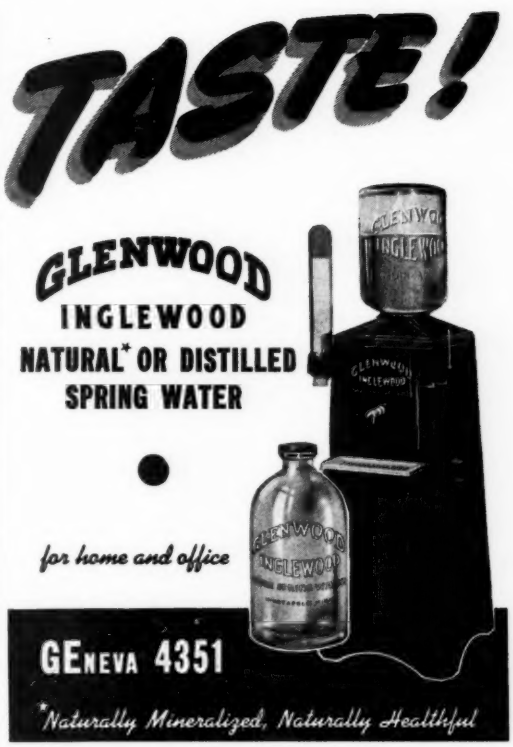
LYMPHATICS, LYMPH AND LYMPHOID TISSUE. Their Physiological and Clinical Significance. Cecil Kent Drinker, M.D., D.Sc., Prof. of Physiology, School of Public Health, Harvard University; and Joseph Mendel Yoffey, M.Sc., M.D., F.R.C.S. (Eng.), Senior Lecturer in Anatomy, University College of South Wales and Monmouthshire, Cardiff, Wales. 406 pages. Illus. Price, $4.00, cloth. Cambridge, Mass.: Harvard University Press, 1941.

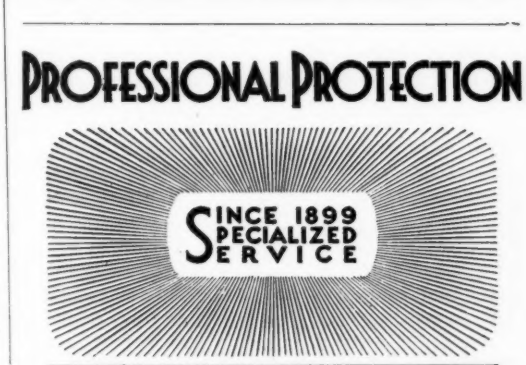
COMMUNITY ORGANIZATION FOR HEALTH EDUCATION. Report of a Committee of the Public Health Education Section and the Health Officers Section of the American Public Health Association. 120 pages. Illus. Price 9c, paper cover. Cambridge, Mass.: The Technology Press, 1941.

THE CARE OF THE AGED. (Third Edition) Malford W. Thewlis, M.D. Attending Specialist, General Medicine, United States Public Health Hospital, New York City; Attending Physician, South County Hospital, Wakefield, R. I.; Special Consultant, Rhode Island Department of Public Health. 579 pages. Illus. Price, $6.00, cloth. St. Louis: C. V. Mosby Co., 1941.

NECROPSY—A Guide for Students of Anatomic Pathology. Bela Halpert, M.D. Assistant Professor of Pathology and Bacteriology, Louisiana State University School of Medicine, and Visiting Pathologist, Charity Hospital of Louisiana, New Orleans. 75 pages. Price, $1.50, cloth. St. Louis: C. V. Mosby Co., 1941.

PRINCIPLES OF MICROBIOLOGY. Francis E. Colien, B.S., M.S., Ph.D., F.A.P.H.A. Associate Professor of Bacteriology and Preventive Medicine in the Creighton University School of Medicine; Lecturer in Public Health and Preventive Medicine, Creighton Memorial, St. Joseph's Hospital School of Nursing; Director of Laboratories, Health Dept., City of Omaha; Major, Sanitary Division, U. S. Army Medical Reserve; Formerly Professor of Bacteriology and Preventive Medicine in the Central School of Nursing, Milwaukee. And Ethel J. Odegard, R.N., A.B., M.A. Instructor in Sciences Applied t Nursing, College of St. Theresa, Winona, Minnesota; formerly Director of Nursing Education in Central School of Nursing, Milwaukee; Education Director Miami Valley Hospital School of Nursing, Dayton, Ohio. 444 pages. Illus. Price, $3.00, cloth. St. Louis: C. V. Mosby Co., 1941.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A TEXTBOOK OF BACTERIOLOGY. Third Edition. R. W. Fairbrother, D.Sc., M.D., M.R.C.P. Director of the Clinical Laboratory, Manchester Royal Infirmary; Special Lecturer in Bacteriology, University of Manchester; Major, R.A.M.C.; Late Research Fellow in Bacteriology, Lister Institute, London. 451 pages. Illus. Price, $5.00, cloth. St. Louis: C. V. Mosby Co., 1941.

ESSENTIALS OF PHARMACOLOGY AND MATERIA MEDICA FOR NURSES. Albert J. Gilbert, M.D. Instructor of Pharmacology, Aultman School of Nursing, Canton, Ohio; formerly Instructor of Pharmacology and Therapeutics, John Sealy College of Nursing; formerly Instructor of Pharmacology, University of Texas Medical School, Galveston; and Selma Moody, R.N. Instructor in Nursing Arts, Presbyterian Hospital of the City of Chicago. 251 pages. Illus. Price, $2.25, cloth. St. Louis: C. V. Mosby Co., 1941.

HEMORRHAGIC DISEASES: PHOTO-ELECTRIC STUDY OF BLOOD COAGULATION. Kaare K. Nygaard. St. Louis: The C. V. Mosby Company, 1941. 320 pages. Illus. $5.50.

The author, who is well known in Minnesota, has been a fellow in surgery at the Mayo Clinic. During this time he wrote many papers on the coagulation of the blood. In the present volume he summarizes his investigations on the coagulability of the blood which were carried out by the photo-electric method. He began analyzing the clotting phenomenon of recalcified plasma with this method in 1935 and has subsequently applied it to many of the hemorrhagic diseases.

In the first part of the book he describes his method and the results he has obtained with it. In measuring the clotting time of recalcified blood plasma he has found that there are four phases:

1. The period of dissociation comprising the interval from the beginning of the reaction to the first formation of fibrin.

2. The period of fibrin formation comprising the entire continuous process.

3. The rest period.

4. The period of clot retraction.

A fifth factor, the amount of fibrin formed, can also be measured, Nygaard has not followed up this phase, however. Microscopic studeies revealed a change in the size and outline of the platelets with clumping preceding the actual formation of fibrin. He believes that the velocity of the process of blood coagulation is a relative expression of the velocity of thrombin formation.

In the second part of the book he presents a classification of hemorrhagic manifestations. He divides his classification into two principal groups:

A. Hemorrhagic manifestations of non-hematologic origin, i.e., vascular.

B. Hemorrhagic manifestations of hematologic origin, i.e., disturbances of the clotting mechanism.

He does not classify hemorrhagic diseases per se because the lack of information concerning the etiology and pathology of many of them does not allow definite

delineation as an entity. With his method he has studied the clotting of the plasma in hemophilia, thrombocytopenic purpura, vitamin K deficiency, hemorrhagic disease of the newborn, and the hemorrhagic tendency in the disease of the gall bladder, bile ducts, pancreas and liver. His findings agree with those of previous observers in regard to the vitamin-K-prothrombin mechanism. He thinks hemophilia is due to a quantitative deficiency of thromboplastin in the plasma, combined with a qualitative deficiency of the platelets. He has also confirmed Gram's findings that there is a hypocoagulability of the blood plasma in thrombocytopenia.

This is not a text book. It is a very thorough monograph with complete bibliography on the photo-electric method of studying blood coagulability and the results obtained thereby.

WM. D. COVENTRY, M.D.

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NEW and NONOFFICIAL REMEDIES, 1941. Containing descriptions of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1941. Cloth. Price, postpaid, $1.50. Pp. 691—LXX Chicago: American Medical Association, 1941.

"New and Nonofficial Remedies" is the book in which are described the medicinal preparations found by the Council on Pharmacy and Chemistry to be acceptable for the use of physicians. The book is cumulative; each year there are added the descriptions of products accepted during the foregoing year. Those taken off the market or found no longer worthy of continued acceptance are deleted. The book is at that time also revised to bring it up to date with the most recent medical thought. Until recent years the additions and deletions have about balanced. Recently, however, the bulk of the book has been increasing and this year's volume represents the largest book of the more than thirty volumes that have been issued.

This year's new additions include the new sulfanilamide derivative, sulfathiazole, as well as sulfapyridine sodium; antipneumococcic rabbit serum of types I, II, III, V, VII and VIII; human convalescent measles serum and human convalescent scarlet fever serum; and staphylococcus antitoxin. The field of endocrinology is represented by the addition of chorionic gonadotropin (follutein). The addition of shark liver oil reflects the search for new sources of vitamins A and D caused by the cutting off of foreign cod liver oil. Other newly accepted preparations are ampules of camphor, digilanid and magnesium trisilicate.

The most extensive revision is represented by the rearrangement and amplification of the chapter, Serums and Vaccines. This chapter is now prefaced by a helpful index, an innovation in N.N.R. The chapter, "Vitamins and Vitamin Preparations for Therapeutic and Prophylactic Use" has been revised to keep it abreast of the newer developments in this field. Here, too, we find something of an innovation in the systematic use of graphic chemical formulas. It is understood that this practice will be extended to other


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parts of the book in future editions. Careful perusal will reveal minor revisions in many parts of the book made in the interest of greater clarity and in the effort to keep the book thoroughly up to date.

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ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY F THE AMERICAN MEDICAL ASSOCIATION FOR 1940. Cloth. Price, $1.00. Pp. 181. Chicago: American Medical Association, 1941.

This volume contains not only all of the published reports of the Council for the preceding year but also reports on products which were not deemed important enough to be published in THE JOURNAL. Council reports may be classified in general as those of omission or rejection, preliminary reports and status reports on drugs or on various therapeutic and pharmacologic problems. Representatives of all classes appear in this volume.

There are a number of interesting reports in the "nonacceptable" category. The one on the widely exploited Neurosine of the Dios Company sounds a timely warning on the hazards of bromidism and uncontrolled hypnotic medication. The report rejecting a number of preparations of gonadotropic hormone from the serum of pregnant mares, together with the report rejecting certain ovarian and anterior pituitary preparations, attest the Council's continued critical interest in the field of endocrinology. This is also indicated in the report on Desoxycorticosterone, written by Doctor Edgar S. Gordon and adopted by the Council for publication with a statement of the Council's attitude on the present status of adrenal cortex. The Council finds adrenal cortex therapy now in an unsatisfactory and unsettled state.

Two reports relegate to the therapeutic scrap heap, the drugs Isacen and Melubrin: Isacen was accepted in 1926 as a nontoxic laxative or purgative; Melubrin is an anti-pyretic which seemed to have promise when it was accepted in 1913 but which the manufacturer has now ceased marketing. It is interesting to note that at the time these preparations were accepted the Council expressed some misgiving which later proved justified.

Noteworthy preliminary reports are on Guanidine Hydrochloride-Calco, which has been proposed for use in the treatment of myasthenia gravis, and Acetylglycarsenobenzene, a new antisyphilitic for intramuscular use, which the Council feels should be further perfected. In its report the Council comments with approval upon the manner in which the Winthrop Chemical Company has developed the latter and studied it before even considering its commercial production.

Among the nomenclature reports are those designating "Pyridoxine" and "Pyridoxine Hydrochloride" for Vitamin $B_6$ and Vitamin $B_6$ Hydrochloride; "Sulfathiazole" for 2-Sulfanilamidothiazole and "Sulfamethylthiazole" for 2-Sulfanilamido-4-Methylthiazole. Preliminary reports on these drugs as well as on Phenothiazine and Histaminase are included.

It is difficult to choose any among the so-called status reports for special mention—all are noteworthy for one reason or another. The report on the present

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status of the injection treatment of hernia is a continuation of the Council's consideration of this question. The Council has reached the decision that it is necessary to condemn the exploitation of the injection treatment of hernia by manufacturers of solutions.

Another status report that must be mentioned is that on Lipocaic, a new pancreatic hormone concerned in some way with the normal transport and utilization of fat. The Council awaits developments of further clinical evidence for Lipocaic and expressed the opinion that the method should not be recognized for routine practice.

Mention must be made of the excellent report on organic mercurial compounds as bactericidal agents, which states the Council's conclusion that no organic mercurial compound has yet been offered that will guarantee the destruction of spores under all conditions.

Another valuable report is that on the promiscuous use of the barbiturates. This is a continuation of a previous study of the use of barbiturates in suicide. The present study is an analysis of hospital data.

One cannot even glance through a volume such as this without reflection on the great value of the Council on Pharmacy and Chemistry's work, which so richly deserves the support of all who are interested either directly or indirectly in the progress of medicine.

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## PARADUODENAL HERNIA

*(Continued from Page 783)*

It was in a man sixty-three years old, who first claimed never to have had an injury, but on closer questioning remembered that when seventeen years old he was knocked over by the beam of a stump puller. When the stump, secured by a heavy chain and fastened to a long beam, was twisted out of the ground, two horses pulling on the outer end of the beam, the harness broke and there was a terrific blow that knocked the boy over. He was sick for some weeks, but then got over it. He had broken some ribs but later apparently had not had any very serious discomfort except at times considerable epigastric pain. His gall bladder had been removed a short time before I saw him. There were no stones and the patient was no better.

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The meeting adjourned.

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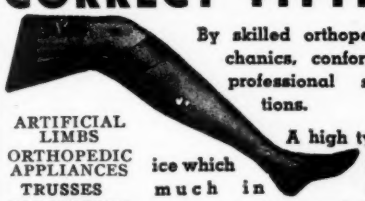

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## OF GENERAL INTEREST

*(Continued from Page 794)*

Walter F. Larrabee, Jr., of Chippewa Falls, Wisconsin, who was graduated from the University of Minnesota School of Medicine and who interned at the University of Minnesota Hospitals; Dr. Leonard L. Lovshin of Chisholm, graduate of the University of Wisconsin medical school; Dr. C. Naumann McCloud, Jr., of Saint Paul, graduate of the University of Minnesota medical school and intern at Ancker Hospital in Saint Paul.

Also, Dr. Frederick M. Stark of Saint Paul, a graduate of the University of Minnesota medical school; Dr. Charles P. Marvin of Saint Paul, graduate of the University of Minnesota medical school and intern at Ancker Hospital in Saint Paul; Dr. Vincent F. Swanson of Minneapolis, graduate of Northwestern University medical school who interned at Minneapolis General Hospital and was resident in anesthesia at University of Minnesota Hospitals; Dr. Collin S. MacCarty of Rochester, a graduate of Johns Hopkins University medical school and intern at Johns Hopkins Hospital; Dr. Kenneth G. Wilson of Minneapolis, graduate of University of Minnesota medical school who served his interneship at St. Luke's Hospital in San Francisco.

Dr. Robert C. Brown of Fargo, North Dakota, a Cole Exchange Fellow in orthopedic surgery from the University of Minnesota, is with Dr. M. S. Henderson and his associates.


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